The Builder.

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Bridges and Blunders.

LONDON BRIDGE is again in danger. A good many years ago a hard fight had to be made to prevent the entire disfigurement of this noble monument—this "sublime bridge," as Street called it—by the jutting out of foot-walks on cantilevers from its sides, on the pretence that the bridge was not wide enough for the traffic; a procedure which would have totally ruined its appearance. It is extraordinary to see, when there is a great building to be spoiled, how eager some classes of persons, especially those of the official persuasion, are to find out that practical considerations necessitate the proposed vandalism. The traffic over the bridge has no doubt increased since the period of the last assault upon it, yet we fail to see that even now any case is made out for a necessity to widen it. We have often crossed and seen a considerable proportion of unoccupied space on the roadway. But from ominous paragraphs in the papers it appears that Rennie's work is again threatened, and that the Committee dealing with the matter have called in a very eminent engineer to advise them on the various schemes submitted for widening the bridge. What these schemes are seems for the present to be kept dark; but we can hardly doubt that the cantilever or balcony scheme will be brought up again, because, when it comes to a question of widening the roadway of a bridge, this is the cheapest and readiest way. It may be argued that the eminent engineer who is said to be consulted will certainly take due care of the work of a celebrated member of his own profession in past days; but we fear that is a *non sequitur*. Rennie himself had far more of æsthetic perception than most engineers of the present day—London Bridge itself is a proof of that; and we fear that a modern engineer will take no thought for anything, in such a case, but economy combined with safe construction, and that if that programme involves spoiling the bridge, spoiled it will be, without compunction.

We hope the public will realise that London Bridge is an erection to be proud of; that it is one of the finest things London can boast of; that any operation which will impair its monumental grandeur will be a serious blunder; and that an increased facility for traffic from widening the roadway will not compensate for this.

Our own opinion of what should be done may be very briefly expressed. In the first place, let us be quite sure that greater accommodation for traffic across the bridge is really a necessity—a point on which we have considerable doubt. If, however, it is impossible to come to any other conclusion, then let the bridge be widened in the only way in which its dignity and monumental character can be preserved, viz., by widening the arches in granite on one side of the bridge, taking out the facing of Rennie's work on that side and replacing it outside the added masonry; leaving the rest of the existing work, and the other face of the masonry, untouched. That would cost more than cantilever balconies, no doubt, but it would preserve a grand structure unimpaired for future ages. Moreover, the new portion would have its own foundation; whereas the building out of anything from the existing bridge would add a weight to the existing foundation which it may not be adequate to.

From the threatened treatment of London Bridge we turn to the scheme for the new Lambeth Bridge, which came before the London County Council last week. The engineer has prepared two types of bridge, a suspension bridge and a bridge of the braced-arch type; *i.e.*, we presume, a steel arch with cross bracing in the spandrels. Either of these would, of course, be essentially an engineer's bridge, one of steel and not of masonry. To this we have no objection provided they are honestly treated; only we may observe that a suspension bridge is seldom practically satisfactory where there is to be a large wheeled traffic; and there is no doubt that in the process of improvements and alteration of street line which are almost certain to take place before long on the north side of the river at this point, and which will render the Lambeth Bridge a more direct thoroughfare than it is at present, there is likely to be a considerable and increasing wheeled traffic over Lambeth Bridge; the pressure of such a development of traffic is indeed one reason for the requirement of a new bridge; and a suspension bridge will not remain rigid under a large wheeled traffic. In such cases it always degenerates into a "drive slowly" bridge, and thus to some extent defeats its own end. If there is not to be a masonry bridge, therefore, let us have the braced-arch bridge. The conclusions of the London County Council on the subject are amusing. They recommend that "one of the best authorities on Gothic architecture of the day should be asked to advise in working out the details of the piers, towers, and abutments of the bridge." It would seem, then, at the first glance, that the demonstrations which have been made in reference to Vauxhall Bridge, in regard to the necessity of employing an architect to design the architectural details have not been entirely without their effect; though one does not understand at first sight the reason for this change of policy. In regard to Vauxhall Bridge we were told that to employ an architect in conjunction with the engineer would be a direct slight to the engineer; but it appears that in connexion with the new Lambeth Bridge this objection disappears, and the engineer is to be "slighted" here, though it is pronounced impossible at Vauxhall. But alas! what does the reader suppose is the reason for this unexpected arrangement? Why, that the bridge will be situated in the neighbourhood of the Houses of Parliament, "which are in the Perpendicular Gothic style of architecture," and must therefore be "Gothick-ed" to harmonise with them.

Here is the old blunder of the Tower Bridge over again. The Tower Bridge was to be sham-Mediæval because it was near the Tower, and so a quantity of sham-Mediæval details have been plastered over the real construction, rendering it a piece of pretentious gimcrack. One would have thought this had been ridiculed enough to have opened people's eyes to some extent. Is it impossible that the public and their official representatives can ever learn anything about the real meaning of architecture? Are they aware that the one defect of the Houses of Parliament is exactly that it is in the "Perpendicular Gothic style," *i.e.*, in an imitation of a past style of architecture, forced on its architect against his will, and which is just the æsthetic mistake in an otherwise great building. And now it is proposed, because this is so, to repeat the same mistake in the new bridge, and clothe it in a sham mediæval garb to harmonise with the sham-mediæval garb of the adjacent building. That is not the way to go to work in the matter. All that is necessary is that the bridge should be an honestly treated piece of engineering construction, with no bad or sham ornament about it. In that case there will be nothing vulgar about it, and nothing that will or ought to offend any one's taste. The sure way to spoil it is to bedizen it with ornament which is foreign to its purpose and which is imitative of a past style, pretending to be what it is not; and in the present state of feeling of architects on this subject it is probable that if the County Council do engage "one of the best authorities on Gothic architecture of the day" for any such purpose, he will frankly tell them that they are making a mistake, and that that is not what is wanted.

We give the London County Council credit for wishing to do the right thing, though we cannot understand why they should have so obstinately refused to associate an architect with the engineer in the case of Vauxhall Bridge, and yet be willing to do so in this case. The fact seems to show that they are learning a lesson, but have only got half-way. There are two things that may be done with a bridge of the kind proposed. One is to leave it frankly as a piece of structure, with no decorative treatment at all. It will then have the interest of structure, and it will at all events be honest. The other is to treat it as a work of art, and in that case no doubt an architect should be associated with the engineer. But to put sham Gothic ornament upon it is to do neither, but simply to create an absurdity; and it is futile to engage an architect for such a purpose. That is not what architectural design is for.

Concurrently with the question of widening London Bridge, we observe that the much smaller question of depriving St. Martin-in-the-Fields church of part of its base, under the pretence of widening the street at that point, has again been pushed forward by the Improvements Committee of the County Council. We had hoped that the sensible opinion delivered by the rector of the church, the last time the matter was discussed, had settled it. But this is another illustration of the passion that seems to exist among London officials for spoiling architecture whenever there is any chance of an excuse for it. That the proposed alteration of the steps which form the base-ment to the portico of St. Martin's will spoil the effect of a fine building there can be no doubt whatever. As to the pretext raised for it there is every doubt. We may say that we have constant occasion to pass St. Martin's-place, and we have never at any time seen anything like an inconvenient crowding of traffic there. What temporary check there occasionally is, is caused only by the cross line of traffic from the Strand to Pall Mall East, and would be totally unaffected by any widening of St. Martin's-place. The proposal of the "Improvements Committee" (surely ironically named in this case!) really amounts to doing a wanton injury to a fine building under the pretext of removing an imaginary and non-existent inconvenience. We are glad to see that the amendment moved by a prominent member of the County Council, to refer the matter back to the Committee "with instructions to take expert opinion as to the architectural effect of the proposed alteration," was carried without a division, so that the mischief is staved off for the present. Mr. Shaw-Lefevre is not, unfortunately, a *persona grata* to architects; but in this instance at least he has earned their thanks.

MANCHESTER DOCK EXTENSION.

SLOWLY, but surely, the Manchester Ship Canal is beginning to justify the anticipations of its founders. Having had to combat the usual antipathy of the public to all new things, to compete with the rival port of Liverpool, and to live down an attempted boycott on the part of the railway companies, Manchester has already become one of the great distributing centres of the United Kingdom. Since 1898 the congested state of the dock quays has constituted a serious problem. For the accommodation of merchandise and for dealing with inward and outward cargoes, extensive storage warehouses and transit sheds have been built, encroaching upon the spaces intended for "open-air" cargoes, which, in turn, have encroached upon the roads and railways. Moreover, the conditions attending the timber trade in Manchester are somewhat different from those prevailing in other ports. Manchester is the centre of a district where large quantities of timber are used both by builders and by packing-case makers, whose facilities for storage are limited. Consequently, the docks are practically used as a general store-yard for the surrounding district. Concurrently with the development of traffic an increase has taken place in the size of cargo steamers, thus rendering inadequate the established proportion of quay area to water frontage.

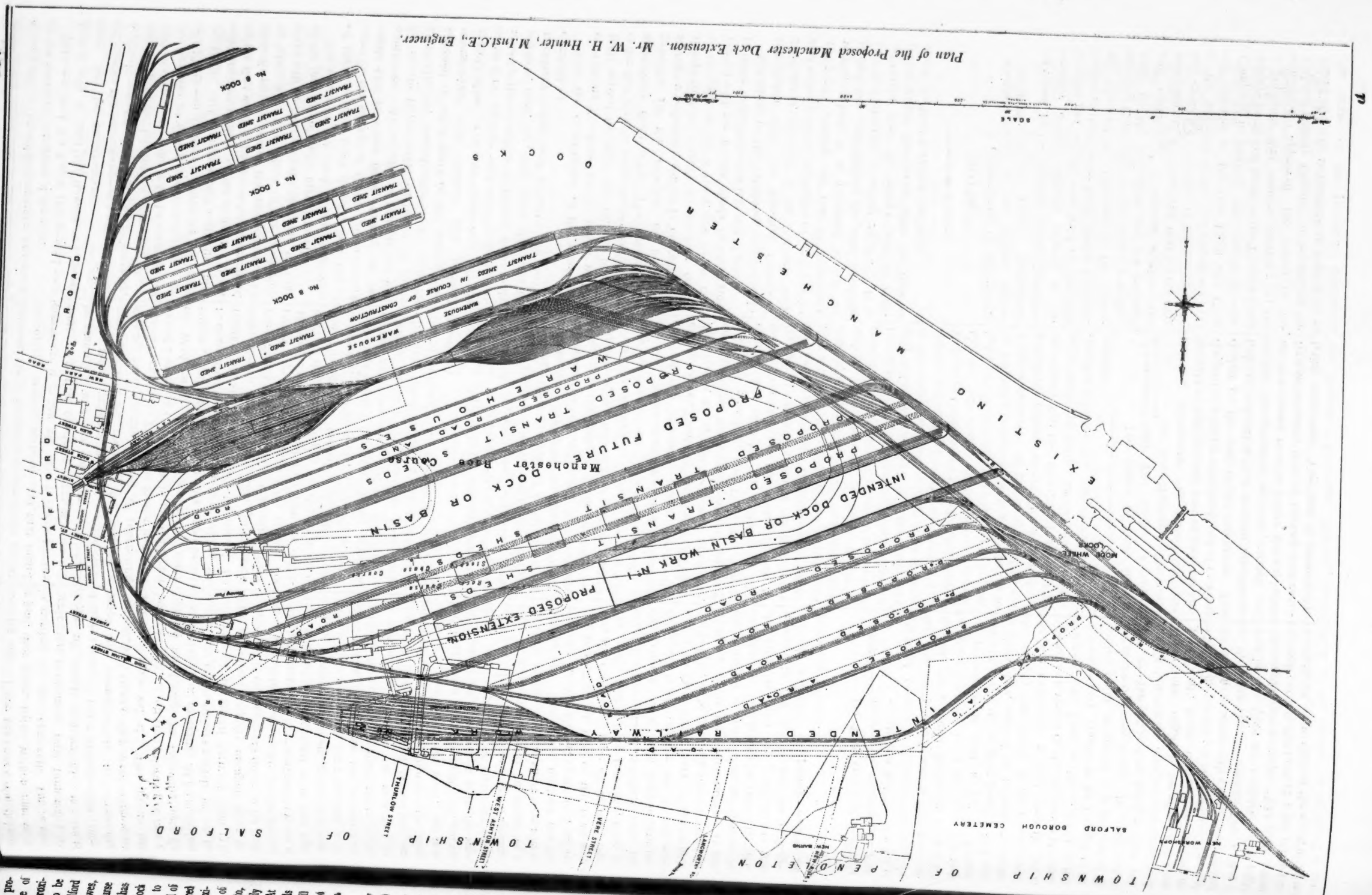
All these circumstances combine to render necessary the considerable extensions of the dock system now contemplated by the Canal Company. The additions in question are indicated by the plan on p. 357, for which we are indebted to the courtesy of Mr. W. Henry Hunter, M.Inst.C.E., Chief Engineer to the company. In the original plan the works not yet carried out are shown in red lines. The distinction cannot be carried out in our cut, but the lettering of the plan will be sufficient to explain.

Development of the docks in a north-westerly direction is at present barred by the Manchester Racecourse, which, with other lands, was scheduled to be purchased as long ago as the year 1883, but the proposal was withdrawn in consequence of opposition to the Canal Bill. The approximate areas of land now proposed to be acquired include 3 acres from the Salford Corporation, 41 acres from Captain Clowes, and 100 acres from the Racecourse Company. When the new territory has been incorporated, the area of the dock system from Mode Wheel sluices to Trafford-road will be 312 acres instead of 168 acres, as at present, and it is considered that the accommodation will be approximately commensurate with the capacity of the waterway forming the approach thereto, and upon which a capital sum of nearly 10,000,000*l.* has already been expended. At the same time it is quite within the bounds of probability that further expansion will ultimately be demanded by the exigencies of a growing trade and by the necessities of a rapidly increasing industrial population.

The new works whose details are now engaging the attention of the engineer will include the construction of one new basin, of additional roads, railway tracks, warehouses, and transit sheds, and the laying out of open-air storage grounds. It is not probable that the company will obtain possession of the racecourse before December 31, 1901, and by that time all the plans will have been completed and contracts let for the construction of the first basin. On reference to the plan it will be seen that only about three-quarters of this dock is to be excavated at first, but at the easterly end a temporary timber coffer-dam will be formed, so as to permit the extension to be carried out afterwards without causing interruption to the traffic of the new dock. The area of the first instalment will be 9·2 acres, and the length of quay frontage afforded will nearly approach three-quarters of a mile. When complete, the new basin will cover an area of more than 13 acres with a water frontage of one mile, and will increase the berthage for large modern steamers in the port of Manchester by nearly 50 per cent. No novel engineering problems are likely to occur in the formation of the basin, and the walls will be constructed in a manner equal and similar to the dock walls already existing in other parts of the port. In setting out the railway and other works, due provision will be made for the construction of a second basin, separated from the first, as shown on the plan, by an intervening pier.

With regard to railway facilities, it may be remarked generally that the functions of the Ship Canal Company are analogous to those of a railway company. Traffic is exchanged and rates are shared with all the principal lines in the kingdom, and the docks include a complete railway system, on which a regular service of trains is in operation from one part to another, as well as to certain junctions, so that connexion may be made with the goods trains of other companies.

For the safe and economical working of the goods traffic, it is essential that the through line of railway should be at the back of the dock system, so that no interference may be occasioned by or to the cross traffic on the quays, roads, and railways. It is proposed to construct this through line at the earliest possible moment so that it may be available for traffic. Large storage



Plan of the Proposed Manchester Dock Extension. Mr. W. H. Hunter, M.Inst.C.E., Engineer.

sidings will be formed in connexion, as shown on the northern boundary of the site.

Between Dock No. 8 and the second new dock a strip of land 250 ft. wide will be set apart for the construction of "balloon" sidings for the interchange of traffic with the Lancashire and Yorkshire Railway Company, and to provide for future developments a further strip 60 ft. wide is to be reserved for the increase of siding accommodation. As usual between railway companies exchanging traffic, each company will construct and work its own portion of the sidings. Work on the first set of sidings will be commenced directly possession of the race-course can be obtained. Extensions of the dock railways will be constructed from time to time as the increase of traffic may demand.

The whole of the land to the north-west of the first new dock will be laid out at once for the storage of timber, all necessary roads and railways being formed at the same time. As the area of this portion will be nearly thirty acres, exclusive of roads and railways, considerable relief will be afforded to other parts of the docks, now overstocked with timber and general merchandise. On the south-east of the same dock another yard will become available for the reception of timber, dye-woods, pig-iron, ores, &c., and upon this area all necessary roads and railways are to be established.

After the construction of the new dock continuous five-floor transit sheds will be built, served by roads and railway lines, in order that general cargo trade may be more adequately dealt with. The scheme also provides for the erection of additional storage warehouses, similar in character and design to those already in existence on the north quay of No. 8 Dock, and to be connected with the transit sheds by conveyors, in order to facilitate the transfer of goods.

According to the estimates, deposited in compliance with the Standing Orders of Parliament, the cost of the first new dock and railway works, exclusive of land, will be 150,503*l*. Adding the cost of subsidiary works, which it is proposed should be undertaken immediately, the total expenditure will amount to nearly 243,000*l*. It is estimated that the works will be completed within three years after the date on which the land becomes available.

NOTES.

Conference on London Gas. A conference of representatives of the various metropolitan Local Authorities convened by the London County Council to consider certain matters relating to the London gas supply, was held on the 17th instant at the County Hall, Spring Gardens. Mr. Cornwall, the Chairman of the Parliamentary Committee of the Council, presided. After lengthy discussion, and the proposal and withdrawal of various motions and amendments, it was agreed that (1) the time has come for a revision of the sliding scale, in the interests of the gas consumers; (2) the practice of the Gas Light and Coke Company in treating differentially the consumers north and south of the Thames forms a grievance that requires redress; (3) the conference approved the action of the London County Council in requesting the Board of Trade to institute an inquiry as to the cause of the persistent differences between the illuminating power of the gas at the official testing stations and that found elsewhere with the aid of a portable photometer; (4) that capital powers should not be granted to any gas company for a longer period than five years; and (5) that the companies should be required to institute a sinking fund for the purpose of redeeming obsolete capital. The Lord Mayor has convened a meeting to be held in the Guildhall on Wednesday next to discuss the same subject, and we may take this opportunity to draw attention to two matters which are worthy of attention: first, it should be remembered that on and after July 1 next the South Metropolitan Company have power to supply 15-candle instead of 16-candle gas, and that therefore the difference in the prices of gas north and south of the Thames will probably be still further increased; and secondly, it should be noted that large sums of money are being expended by the gas companies and by the London County Council in connexion with these disputes, which money is eventually drawn almost entirely from the pocket of the gas consumer.

Electric Lighting Regulations. It will be remembered that last summer the London County Council gave permission to the City of London Electric Lighting Company to change their pressure of supply from 100 volts to 200 volts in the Southwark district, subject to twelve conditions. The company appealed to the Board of Trade against these restrictions, and last week it was announced at the London County Council meeting that only the first of the proposed conditions—the one which makes the Company bear the cost of the necessary alterations in the wiring—was allowed by the Board of Trade. Apparently, then, the consumer must buy new lamps for the higher pressure, pay any increased premium the Fire Offices may charge, &c., and be left entirely to the tender mercies of the Company as to the rate at which he is to be charged for the energy he consumes. If the Board of Trade had rejected the whole of the twelve conditions, we could see some reason for their action. The company, no doubt, desire to treat their customers equitably, in view of the approaching competition; but why are they bound to bear the cost of the alterations in the wiring, and not bound to bear other costs to which they are in equity liable? The Highways Committee of the London County Council have done a public service by publishing the conditions they sought to impose on a lighting company wanting to change to a higher pressure. If the company does not voluntarily observe most of these conditions, we expect that the Board of Trade will be kept busy appointing arbitrators to settle disputes between the company and its consumers.

A Low-pressure Boiler Explosion. The Board of Trade inquiry into the boiler explosion at the Municipal Technical Schools, Gloucester, in June last, has brought to light another case of ignorance on the part of a boiler attendant, and of careless design on the part of the engineers. The heating apparatus is a modern installation on the low-pressure system, carried out about eighteen months before the explosion by a well-known firm of heating and ventilating engineers. The heat is generated in two Cornish "Trentham" boilers, placed side by side. From the crown of each boiler a 5-in. flow-pipe, fitted with a Peet valve, is carried up and connected with a short horizontal connecting pipe, from which five flows, all fitted with valves, are taken to different parts of the building. The return-pipes are connected in a corresponding manner, and fitted with five subsidiary valves and two main valves. The fires in both boilers were lit on the morning of June 4, banked up during the following night, and restoked the next morning. At 8 a.m. the back end of one of the boilers was blown out, the boiler being projected forward about 13 ft. The attendant happily escaped injury, but considerable damage was done to the building. The immediate cause of the accident was that the main flow and return valves of the boiler which exploded were shut tight, and the pressure of steam gradually accumulated until it overcame the resistance of the boiler-plates. Of course the attendant was to blame for not having tried the valves, but in extenuation it must be said that the engineers' men, who had been fitting new pipes to the system, told him that the boilers were "full and ready for work," and as he had only been recently appointed, and was not thoroughly conversant with the apparatus, he accepted their statement without question. In a properly-designed apparatus such an explosion would be impossible, at any rate within such a short time after its installation. The great mistake was that only one safety-valve was provided, and that this was fitted on one of the flows taken from the connecting pipe above the boilers. The main flow-valves, therefore, came between the safety-valve and the boilers. The right course would have been to have provided two safety-valves—one for each boiler—and to have fitted them either directly to the boilers, or to the main flows between the boilers and the main flow-valves. To save the expense of an extra safety-valve the designers of the apparatus risked the life of the attendant and the possibility of great damage to the boilers and the building—another example of penny-wisdom and pound-foolishness.

Boiling Test for Cement. Dr. Michaelis, of Berlin, was the first to investigate and advocate the boiling of cakes of Portland cement, and notwithstanding the fact that many modifications have been suggested, the original Michaelis method still appears to be the most reliable. The mode of procedure is that a pat of Portland cement, made up on filter paper placed upon a glass plate, should be allowed to harden for twenty-four hours in air and in water. At the expiration of that time the pat is placed in a vessel containing water at normal temperature. Heat is then applied, so that the water may gradually be brought to the boiling point, at which it is maintained for the space of three hours. If at the end of this time the pat be firm, hard, and free from cracks the cement may be considered good. The cement ought to be mixed with about 3 per cent. more water than is used for making briquettes; it should be well worked for several minutes with a knife, and moulded on the glass into a compact form, so that it may be free from air bubbles, which might afterwards induce cracks. The paste is then spread out into the form of a pat about 3 in. in diameter, very thin at the edge, and ½ in. thick at the centre. It is placed at once

under a damp cloth or in a moist atmosphere until properly set, being next immersed in water for twenty-four hours, and the boiling test may then be carried out. The method in question appears to be correct in principle, and as a rapid test for cement it is worthy of consideration.

Electric Lighting Boards.

We had an opportunity last Friday of inspecting the electric lighting boards and strips which are being manufactured by the Electric Lighting Board Company at their works in Dean-street, Soho. In the E. L. B. system there is no necessity for lamp-holders, sockets, &c. If the strip is carried round the wall of a room, then, in order to fix a lamp, all that we have to do is to take one of their specially made glow lamps, each of which has two spikes attached to its base, and press it on the strip. When the switch is turned on the lamp will light, no matter on what part of the strip we have stuck it, provided the line joining the two spikes is perpendicular to the length of the strip. The two flexible conductors inside the strip have a hard insulating substance between them, but the spikes readily penetrate into the flexible wire through the softer insulating material near the edges of the strip. This strip can easily be let into dado mouldings, so that connection with a standard lamp can be made at any point of a room. In this case the surface of the strip is sometimes made of non-inflammable cork with asbestos underneath, so that there is no danger of fire from arc-ing when removing the spiked plug. This system of lighting is specially adapted for shop windows, showrooms, producing scenic effects in theatrical work, temporary installations (as at banquets, balls, &c.). Large boards are also made into which lamps can be stuck in any desired pattern for street decorations or other purposes. We were favourably impressed with the care with which all details have been worked out; and as this system will in many cases greatly cheapen the cost of electric wiring, it deserves encouragement from the electric lighting companies.

The South Sea House, Threadneedle-street.

The demolition has been begun of the South Sea House, in Threadneedle-street, lately vacated by the Baltic Society—a private association of merchants and brokers engaged in the Russian grain and tallow trades — who removed to Threadneedle-street after the pulling-down of the "Baltic" coffee-house in Sweeting's-rents for the building of Tite's Royal Exchange. The British Linen Company Bank of Edinburgh have bought the premises and site for 350,000*l.* from the Baltic Company. In the rebuilding the front will be set back for a widening of the thoroughfare in pursuance of a scheme by the City Corporation, at a cost of 14,400*l.* A site is being cleared in St. Mary Axe and Jeffrey's-square for the new offices of the Baltic, Mercantile, and Shipping Exchange Company, to be erected, at an estimated maximum cost of 175,000*l.*, after the plans and designs of Mr. W. Wimble and Mr. J. H. Smith as joint architects. The building (1773-4) now being pulled down should not be confused with the old South Sea House in Old Broad-street. That house, formerly the old Excise Office, was destroyed by fire in 1826; the site was taken for the City of London Club, built in 1833, from the designs of Philip Hardwick, R.A. The *later* Excise Office in Old Broad-street was built in 1770-5 at a total cost of 45,408*l.*, from the designs of, it seems, William Robinson, Surveyor to the Customs Board for London,* on the site at the rear of Gresham College and of Sir Thomas Gresham's almshouses; it was pulled down in 1854 when the ground was taken for sets of offices—Gresham House—erected after the plans and designs of Sir William Tite and E. N. Clifton.

The Cloudesley Charity Estate, Islington.

In 1517 Richard Cloudesley, an inhabitant of Islington, bequeathed in trust a plot of land, known as "Fourteen Acres" or "Stoney Field," and directed the trustees to apply the income, to the extent of 2*l.* 13s. 4d., for prayers for his soul in the parish church. That sum was confiscated *temp.* Edward VI. as being for superstitious purposes, leaving a residue of about 4*l.* 10s. The surplus, which will shortly have increased to some 6,000*l.* per annum, was in terms of a deed of trust applied, until 1810, for ecclesiastical and general expenses of the parish church of St. Mary. In 1811 a private Act was obtained for letting the land upon building leases. Then were built, in 1813, the Islington Chapel of Ease, Holloway-road (Wickens, architect), in virtue of a special local Act, and under the "Million" Act of 1818—58 Geo. III., cap. 45—the district churches of St. John, Holloway; St. Paul, Ball's Pond; and Holy Trinity, Cloudesley-square—the three being designed by Sir Charles Barry and erected in 1827-9. In terms of the Act 2 Will. IV., cap. 26, the income from the charity was to be used for the benefit of the entire parish and in relief from the rates, the parish church district surrendering the first 1,000*l.* a year equally among the chapel of ease and the three district churches. The parish vicar and churchwardens recently applied to the Court for a declaration of their title to a prior charge, under Section 8 of the Act, on the income, which now greatly exceeds 1,000*l.* a year, in lieu or in aid of the churchwardens' and St. Mary's district rates, formerly levied or authorised under sections of the Act. In giving judgment Mr. Justice Byrne stated that whilst the Act of 1868 abolished the compulsory collection of Church rates, Church rates and those two particular rates could still be made, and he was of opinion that the income beyond 1,000*l.* to arise out of the estate should go to the repair and maintenance of the parish church and chapel of ease and to the churchwardens' official expenses, in continuance of the two rates formerly levied. An inquiry was held this month, under the London Government Act of 1899, into the Islington Charities and local Acts, and it is understood that the Commissioners will insert in their scheme a clause affecting the surplus income derivable from the Cloudesley Estate.

"The Disfigurement of Dover."

Under the above title Mr. Richardson Evans, the Secretary of the "Society for Checking the Abuses of Public Advertising," has called attention in the daily papers to a flagrant example of advertising vandalism in Dover Bay. One of the American food companies, it appears, has got some one to erect high up on the cliffs, two monster boards on which the name of their product is painted "in letters that dominate and degrade the whole prospect." A memorial has been prepared to the Mayor and Town Council of Dover asking them to exercise whatever influence a municipality posssesses to cause the removal of nuisances of this kind. Mr. Evans adds:—

"If the burghers of Dover wish to protect themselves from an indefinite recurrence of such outrages they ought to follow the example of Edinburgh. The power which the municipality of that enlightened and eminently practical city obtained by an act of last Session has already been exercised to forbid specific defacements of the sort formerly committed with impunity. As soon as the people who resort to these barbarous modes of soliciting custom realise that the community is alive to its rights, they will desist."

Institute of Painters in Water-colours.

The exhibition at present open at the gallery of the Institute of Painters in Water-colours appears to be a kind of by-exhibition, as it is announced that "the eighteenth annual exhibition will be held in January and February." The present is professedly an exhibition of studies and sketches only, and each artist's drawings have for the most part been grouped separately. The collection includes some very interesting work; a good deal that is very mediocre; and some things that are exceedingly bad, and had no claim to be exhibited at all; the usual result when an exhibiting Society has rooms too large for its resources. A collection of landscape sketches by Mr. Wimperis are, as might be expected, of the first order as water-colour art, and a separate larger one, "A Sussex Common" (279), is still finer; but there are no other landscape sketches to rank with these for breadth and power. Among the best of the other landscape studies are some little ones by Mr. Frank Walton (61 to 70); those by Mr. John White (114-122), especially "A Moorland Valley" (121); Mr. F. G. Cotman's "Burseldon" (234); Mr. F. Walton's "Sennen Cove" (239), a delicately handled landscape a little in the manner of Mr. Albert Goodwin; Mr. Weedon's "Bosham" (291), and a collection by the same artist ranging from 451 to 463; Mr. Harry Hine's "Bluebells in Spring" (467); Mr. Joseph Knight's drawings (475-483), notably "Sand Dunes," "Morning Mists," and "Solitude"; Mr. David Green's "Rain" and "In Danger" (523, 524), the latter an admirable sea study; and a collection of Mr. Cotman's drawings (720-729). The drawings by the late Mr. Towneley Green are interesting, and some of them, as Nos. 385 and 386, would have worked out into admirable finished pictures. Mr. Fulleylove exhibits a great many small sketches (334-430) of subjects mostly connected with architecture, but not quite as interesting as we should have expected; there is a good sketch of the interior of St. Paul's Cathedral (410). Mr. E. C. Clifford has commemorated old Kew bridge by two good views of it (87 and 331). The contributions of the President, Mr. E. J. Gregory (339-347), seem not quite up to his usual standard, but, of course, contain some good work. Mr. Henry Stock contributes a sketch of an ideal composition, "The Reunion" (206), somewhat reminding one of Blake, and also two very delicate and beautiful portrait studies of the head of a girl (238 and 244).

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* See the print, 1771, engraved by his son, John Robinson; the design has been attributed to the elder Dance, also to J. Gandy.

The London Sketch Club.

The Fifth Exhibition of the London Sketch Club ("Modern Gallery," 175, Bond-street) contains also some things which are hardly worth hanging in an art exhibition; "The Showman," for instance (73), and the two hard drawings of soldiers in uniform (136 and 140), and others. Landscape studies predominate, and some of these are fine; among the best may be named "Marshes" (2) by Mr. Haité; "In Welsh Meadows" (11) by Mr. Montague Smythe; "Bracken" (66) by Mr. Walker Fowler; and "The Forbidden Path" (79), a small rich woodland scene by Mr. E. O. Davey, somewhat spoiled by a bad figure. Mr. F. Hamilton Jackson sends two or three good and careful architectural sketches, in pencil, of old buildings in Italy; Mr. Shepard's "Souvenir of the Japanese Play" (138) has both humour and decorative effect; Mr. C. W. Quinnell's "Memories" (18), is a head painted with a good deal of feeling—the pendant to it, "A Reverie," we do not like so well; and Mr. C. J. Hobson's "In the Wood" (22), a female figure among the stems of trees, is not only a good nude study but a poetic and charming little picture.

Journalistic Suppression of Artists.

We have often commented on the manner in which English daily papers almost systematically (as it would seem) ignore the name of architect or sculptor in describing the inauguration of any new building or monument. The latest example is the following, from the *Times* of the 19th inst.:—

"MEMORIAL TO HELEN FAUCIT.

The Bishop of Worcester yesterday dedicated a pulpit with which Stratford-on-Avon Parish Church has been enriched by Sir Theodore Martin, in memory of the late Lady Martin (Miss Helen Faucit). The pulpit is octagonal in form, and in the Perpendicular style. The material chiefly used is dark green Italian marble, relieved by alabaster statuettes, which occupy recessed and canopied panels. The statuettes represent St. Ambrose, St. Augustine of Hippo, St. Jerome, and St. Helena. The last is the central figure, and in it the sculptor has reproduced the features of Lady Martin. The dedication service was attended by a large number of clergy and laity."

Then follow the names of some social and literary notabilities who were present. Not a word of the designer of the monument, or of the sculptor who executed the "alabaster statuettes." In the opinion of a newspaper reporter these are probably supposed to grow of themselves; at all events one need give no credit to the artist; it is only the persons who pay for the monument, and those who look on at it, who have the credit. This is partly, no doubt, the fault of the public indifference to art in England. If readers of papers cared to have the name of the artist the journals would find themselves obliged to give it. One might have thought, however, that a daily paper occupying such an exceptional position as the *Times* might give general instruction to its reporters and "readers" that, in recording a new work of art, the name of the artist counts for something.

Housing of the Working Classes, Devonport.—Mr. G. W. Willcocks, M.Inst.C.E., held an inquiry at Devonport Town Hall on the 18th inst. into the application of the Borough Council to the Local Government Board, for sanction to borrow sums of 6,380*l.* and 27,729*l.* for purposes of the improvement scheme made by them under part of the Housing of the Working Classes Act, 1890. Mr. J. F. Burns, Borough Surveyor, produced plans of the proposed areas, &c., and said they had been approved by the Local Government Board.

THE STATISTICS OF SAXON CHURCHES.

BY PROFESSOR BALDWIN BROWN.

V.—Catalogue Raisonné of Examples.

(*Continued.*)

District III.—The Eastern Counties, including Norfolk, Suffolk, Essex, and Cambridgeshire.

This region is well supplied with early churches, though it is not easy to pick out from these the examples to which a pre-Conquest origin may reasonably be ascribed. As a whole, it is not rich in building stone, and flint rubble is largely employed, while Essex builders make a considerable use of Roman bricks. The prevalence in Norfolk, Suffolk, and Essex of round towers is a fact the significance of which has been much discussed.* In matters of the kind the simplest explanation is *cæteris paribus* to be preferred, and the form may be accepted in the meantime as due to the poverty of the available building material. The resulting absence of cut-stone quoins and, for the same reason, of pilaster strips, deprives us of a useful criterion of date, while the flint-rubble walls are, in most cases, tolerably thick. The only remaining criteria are the openings in the form of tower and chancel arches and doorways, double or single belfry windows, and small r. h. or circular lights in the lower stages of towers or the walls of naves or chancels. Some Essex churches are instructive as showing that the use of Roman materials does not necessarily involve an early date, for the tower arch at Felstead is turned in Roman brick, while the enrichments are Norman, and the wall is 4 ft. 5 in. thick. The two Cambridge examples show characteristic Saxon cut-stone work, which in the rest of the district is rare.

There are several examples of outstanding importance. In Norfolk, Dunham Magna possesses a Saxon nave and central tower bristling with characteristic details; while Bassingham is a rare example of a round tower with convincing marks of pre-Conquest date. In Suffolk the round tower of Herringfleet has unmistakable Saxon detail. The much controverted remains at South Elmham are put down in the following list as Norman for reasons given at the place.

Essex presents us with an enigma in the old church, now used as a barn, of St. Peter's-on-the-Wall, near Bradwell. The county possesses a unique treasure in the church of Greenstead, near Chipping Ongar, the nave of which is the only remaining example of Saxon timber work in the constructive part of a building.

Norfolk.

Proceeding through the county from its north-east verge, we come first to *Weybourne*,† the Saxon features of which, noticed by E. A. Freeman in vol. x. of "Norfolk Archæology," are to be found on the old tower, north-east of the present nave of the priory church.

Bassingham, south-west of Cromer, has a pre-Conquest tower, with contemporary nave preserved on the north and west. The distinguishing features are double belfry openings with triangular heads and mid-wall work, and a triangular-headed opening from the tower into the church above the plain tower arch

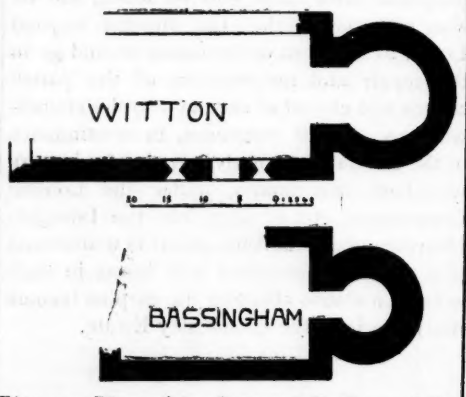


Fig. 17.—Plan of pre-Conquest Portions of the Churches of Bassingham and Witton, Norfolk.

* There are papers on the Round Towers of this region in *Archæologia*, xxiii.; *Journal of Archæological Association*, xxi., xxxvii., xliv., xlvi., xlviii.; and on Saxon Architecture in Norfolk in the *Archæological Journal*, vi.

† Names of churches containing Saxon work are printed in italics. Those enclosed in brackets are to be regarded as doubtful.

that measures 12 ft. in height by 3 ft. 10 in. in width. The combination of these features is conclusive.

At Antingham, near North Walsham, the ruined church south of the present edifice has no distinct pre-Conquest signs, while at North Walsham a mass of old masonry at the west end of the north aisle of the present fine church may be remains of a pre-Conquest edifice, but there are no distinguishing features.

Witton.—The round west tower and north wall of the nave, to a point about 44 ft. from the west quoin, are probably of pre-Conquest work, and the same would apply to the line of the south wall pierced by a later arcade. In the north wall are two small double-splayed circular lights. Plans of Bassingham and Witton are appended (fig. 17).

At Beeston St. Laurence, near Wroxham, the lower stages of the round west tower and west part of the north wall of the nave are older than the rest of the church, but there are no distinctive pre-Conquest features.

Coltishall.—The north wall of the nave, with two double-splayed circular lights close up under the thatched roof, about 15 ft. from the ground, appears to be the relic of a pre-Conquest church.

Passing westwards, and still in the northern half of the county, we find at [*Great Ryburgh*] that the round west tower and west part of the aisleless nave are Early, and the north-west quoin of the nave has some l. and s. feeling that is not, however, very pronounced. The tower arch, 6 ft. wide, is recessed, but the opening to the nave above it has a triangular head. There are no old windows. This is a case in which a judgment as to date, or rather period, is very difficult.

Near East Dereham there is a group of old churches, of which by far the most important is *Dunham Magna*, another most complete and valuable example of pre-Conquest architecture. It has an aisleless nave, central tower without transepts,* and chancel, and in all parts save in the last there are unmistakable details of the period. The most noteworthy features, beside the internal arcading already noticed as resembling that on the exterior of Bradford-on-Avon, are a triangular-headed west door, l. and s. quoins west of nave and at all four angles of the tower, belfry openings with mid-wall work and well-formed mitred cubical caps and bulbous bases, and circular lights on each face of the tower above the belfry openings. The only old windows below are two double-splayed ones north of the nave and south of the ground story of tower. The tower and chancel arches are developed in style, and the whole of the work, though distinctly not Norman in character, is of an advanced type.

Beeston-next-Mileham, a beautiful Decorated church, notable for its genuine old carved pews, shows externally in the clearstory on both sides the marks of large blocked circular windows. These are evidence that the walls are older than the arcades with which they are pierced, but the size of the windows (unless they were double-splayed) suggests a date not earlier than Norman times.

East Lexham.—This somewhat dilapidated church, with some l. and s. work and other pre-Conquest indications, possesses the curious feature of a mid-wall slab of stone filling one of the belfry openings, in which a cross of Early form has been cut (the cross is solid, the background cut away).

[*Newton, by Castle Acre,*] shows remains of mid-wall work in the dilapidated tower, which is axial.

Houghton-on-the-Hill, near Swaffham, is an interesting little church, with signs of antiquity about the nave in the shape of some l. and s. work and r.h. double splayed slits north and south of nave. In that to north the original wooden shutter remains in the central opening.

Near King's Lynn there have been mentioned as Saxon Flitcham church and the ruined chapel close to the keep at Castle Rising. Of these Flitcham has interesting early Norman portions, and Castle Rising (chapel) is a Norman apsidal oratory of a type represented by Mells chapel, near Wenaston, Suffolk. It has thick walls of flint rubble and small r.h. slits, widely splayed internally.

Returning eastwards upon a more southerly

* As a matter of terminology, the word "central" as applied to a tower might be confined to cases where the plan is cruciform. A tower between nave and chancel of a non-cruciform church, such as Iffley, would more correctly be termed an "axial" tower.

line, we find at Cranwich, between Stoke Ferry and Thetford, a round tower of a common type with an old west light splayed internally, but no pre-Conquest features.

Rockland, All Saints, a dozen miles farther east, presents us with a nave constructed in flint rubble with much herring-bone work, and showing l. and s. quoins at all its angles. The west tower and tower arch, as well as the chancel and chancel arch, are later. The east wall at the chancel arch is only 1 ft. thick. The measurements internally were c. 34 ft. by 19 ft. There are no old windows, but the openings of the south and (blocked) north door may be original. The l. and s. work is small in character, and seems to exhibit the dying out of a technique.

In the neighbourhood of Diss, South Lopham attracts attention for its fine Norman tower and various other features of the same date. At the west end of the north wall of the nave there occurs a small circular double-splayed light, with the pierced wooden shutter still in the opening, which may betoken an earlier date for this part of the fabric. Near it, however, in the same wall, is a blocked Norman door of the twelfth century.

Scole.—There are remains of l. and s. work at the south-east quoin of the original nave.

[*Gissing.*]—There is a combination of features here that makes the example instructive. The church has a round west tower with a Norman tower arch with chevron ornament, a small circular west light splayed inside and out, and double belfry lights with mid-wall shafts surmounted by cubical caps. The tower arch resembles the north door of the church, and may be an insertion, as the mid-wall work and double-splayed light can hardly be contemporary with the chevron ornament.

On the line from Diss towards Norwich we come to Tasburgh. The round west tower of this picturesquely-situated church possesses the very high and narrow tower arch (16 ft. 6 in. by 4 ft. 6 in.) characteristic of the East Anglian region. The belfry openings are late and the lower ones internally splayed. On the exterior there are two stages of shallow arcading in the flint rubble of the fabric that looks like Norman work.

At Colney, west of Norwich, on the ringing stage of the round west tower there are three r.h. lights splayed outside and in. Double-splayed lights also exist in the neighbouring church of Cringleford.

At Norwich (Cathedral Close) it has been pointed out that the west wall of the cloisters contains a range of six circular double-splayed windows of pre-Conquest character. The splays, which slope from an outer opening 2 ft. diameter to an aperture of 1 ft., are worked in the flint rubble of the walling and were finished with plaster. The wall is 3 ft. thick.

This is a test case upon the question whether or not the appearance of the double splay is an infallible indication of pre-Conquest date. The writer of a notice of the work in "Norfolk Archæology," vol. viii., thought that the wall might have been an outer wall of defence of a Saxon monastery earlier than the Norman foundation. There is no evidence of the existence of such a monastery, and the wall, independent of the openings, is in position and technique—flint rubble with some herring-bone feeling—what we should expect from the early Norman builders on the site. If in this case we explain the formation of the windows as a survival of an older technique into Norman times, it would govern many others where the double-splayed light is the only visible indication of pre-Conquest date.

Norwich, St. Julian.—The round west tower here has always been accounted pre-Conquest on account of two r.h. double-splayed windows on the ringing stage to north and south. The church exhibits Norman features in both the (aisleless) nave and chancel, but it is impossible to prove that the tower is not a relic of an older edifice. There are indications, in the shape of pilaster-like thickenings, north and south, where it joins the church, that may be quoted in favour of this view.

At Framingham Earl there is nothing now visible that indicates a specially early date. The neighbouring church of Framingham Pigot, which is reported on as having been Saxon, was rebuilt some forty years ago.

Howe.—The west tower here has as good a claim as any in the district to pre-Conquest rank. The tower arch, 12 ft. 6 in. by 6 ft. 9 in. between the jambs, with arch set back 3 in. on each side on the jambs, has shallow mouldings on the imposts (see *ante*, fig. 9), and on the lower stage of the tower, north and south, are small circular lights, splayed inside and out from a diameter of 2 ft. 6 in. to a central aperture of 10 in. (for plan of the light, see *ante*, fig. 6). Swainsthorpe and Shottesham St. Martin (now a ruin) have old r.h. loops, but are probably not pre-Conquest.

In the extreme south-east corner of the county we find the well-known round tower of Haddiscoe, with which may be compared the equally famous example on the other side of the Waveney, in

Suffolk,

of *Herringfleet*. In both these cases we have the pre-Conquest feature of double belfry lights, triangular-headed, with mid-wall work. The caps at Herringfleet are cubical, at Haddiscoe scalloped. Angle shafts are used on the external quoins of the openings, and the billet ornament occurs in hood mouldings round the apertures. Both churches have Norman doorways. If we take into comparison the similar example of Bassingham, already noticed, we may place Bassingham, which has no Norman features, in the pre-Conquest period, may see at Herringfleet, where the east belfry opening is more simply treated, a pre-Conquest tower modified by later Norman detail, and in Haddiscoe a Norman example retaining the native mid-wall work. The tower arch at Haddiscoe is of early character, and measures 12 ft. by 3 ft. 6 in., almost exactly the same as Bassingham.

Bungay, where there is a characteristic r. h. loop in the north wall 2 ft. 8 in. by 6 in. and marks of old lights in the lower stage of the tower, brings us into the vicinity of the interesting ruin at South Elmham, about the date of which there has been some controversy. We have here to all appearance a Norman apsidal chapel of a type represented not far away at Mells Chapel, near Blythburgh; at Castle Rising (v. *supra*); at Maplescomb-under-Kingsdown, in Kent, and other places. It is built of flints carefully faced, with walls about 4 ft. thick, pierced by internally splayed windows. The nave has a western division cut off by a wall, an arrangement to be paralleled in a Norman church not far away at Gillingham, near Beccles. The only feature that appears problematical is the chancel arch. The width of this between the existing jambs must have been about 20 ft., and for abutments there is on each side a portion of wall about 4 ft. thick and about 7 ft. in the direction of the thrust. If this wall, strengthened as it is by the walls of the nave and presbytery which join it at right angles, is held insufficient to support a single arch of 20 ft. span, a triple or double arch must be assumed, the intermediate piers of which can have rested on a sleeper wall which crosses the opening. This sub-divided chancel opening is an early feature (see *Archæological Journal*, vol. liii., p. 298 f.), and on the strength of its assumed existence here, South Elmham has been claimed on high authority for the seventh century. It needs hardly be said that there is nothing in the historical argument according to which this place is the "Elmham" where Archbishop Theodore fixed in 673 the second seat of the divided East Anglian diocese. As it is only some dozen miles from the original bishop's seat at Dunwich, such an arrangement would have been absurd, and the Elmham in question must be North Elmham, in Norfolk.

The portion of the plan of the ruin given in fig. 18 will facilitate judgment on the technical

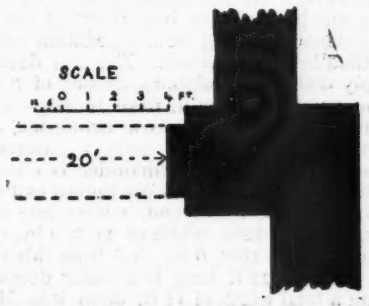


Fig. 18.—Southern Abutment of Chancel Arch at South Elmham, Suffolk.

question of the support of the chancel arch, and it should be added that the quality of the mortar is surpassingly good—so good, that at the west end a portion of the wall overhangs about 4 ft., with no support but the tenacity of the binding material of the masonry.

In the ruined church on the hill at Dunwich no pre-Conquest features are to be distinguished, but *Darsham* possesses what looks like a Saxon north door.

In the more southern part of the county a group of churches exhibit l. and s. work in the quoins and some other early features. There may be mentioned, in order from north to south, *Debenham*, where there are l. and s. quoins to the fine square west tower, *Gosbeck*, *Hemingstone*, *Barham*, and *Claydon*.

Essex.

The Essex churches are notable for the large employment of Roman material, the use of which does not, however, always betoken a pre-Conquest date. The tower of *Trinity Church, Colchester*, is one example. Another is *Great Hallingbury*, near Bishop Stortford This church is rebuilt, but the old chancel arch remains, and shows an arch 11 ft. 6 in. in span, recessed on the west face, constructed of Roman brick, and springing from imposts of the same material. This looks like pre-Conquest work, but, on the other hand, the tower arch at Felstead, though turned in Roman brick, starts from Norman stone jambs with angle shafts. There are other examples of such arches where a decision as to date is difficult. The wooden nave of the church at *Greensted* is a unique example of Saxon timber construction. It is to be noted that there is no sign in it of the frame-and-filling technique which belongs to later mediæval times, but it is built of split boles of oak-trees set upright side by side with the rounded part outwards, after the fashion of the timber palisading shown on the moated mounds in the Bayeux tapestry.

A building of great interest is [*St. Peter's-on-the-Wall*] near Bradwell. This ancient church, now used as a barn, and measuring internally 49 ft. 9 in. by 21 ft. 9 in., has lost its presbytery, which was apsidal, but preserves traces of a sub-divided "arch of triumph," where we see the springing in Roman brick carefully laid of the subsidiary arches. The walls are 2 ft. 4 in. thick. The masonry is of small squared stones, in parts curiously like the *petit appareil* of early churches in Northern France. Long Roman stones are used upright in the quoins. This technique, the apse, and the subdivided presbytery opening seem early, but the puzzling features are the buttresses, 2 ft. wide by 1 ft. 10 in. in projection, that are partly in bond with the walls, and partly, as at the west end, built up against them, and leave the actual angles of the building free. It has been held on the one hand that the building was erected by Bishop Cedd in the seventh century, and on the other that it belongs to the twelfth or thirteenth centuries.* Its general site, the old Roman fortress of Othona, is in favour of the first view, but its actual location in the very opening of the principal gate of the fortress is against it, as in Cedd's time this gateway would still have been in use. It is a puzzling structure, and some further attention might well be paid to it.

Cambridgeshire.

This county presents us with two important monuments; *St. Benet's, Cambridge*, with its fine Saxon tower, where we find externally l. and s. quoins and mid-wall work in belfry openings, and in the interior a grand tower arch with moulded imposts returned along the east face of the wall, and pilasters carrying archivolt mouldings, at the springing of which are lions carved in relief, and *St. Giles, Cambridge*, where in a reconstructed church is preserved a good late Saxon tower-arch, now at the east end of the south aisle.

Brockwell Park Extension.—The contract for the purchase of the additional land—43 acres—at Brockwell Park, Herne Hill, was ratified three or four weeks ago, the purchase moneys amounting to 64,500*l.*, and towards the total costs a balance of about 3,700*l.* is still needed. The land has been bought from the Blackburn Estates trustees by means of contributions by the London County Council—in whom the freehold will be vested—30,000*l.*; Lambeth Vestry, 20,000*l.*; Camberwell Vestry, 8,000*l.*; Newington Vestry, 1,500*l.*; the Ecclesiastical Commissioners, 1,000*l.*; the City Parochial Charities Trustees, 1,000*l.*; St. George, Southwark, Vestry, 500*l.*; and an anonymous donor, 1,000*l.*

* See for the first opinion *Archæologia* xli., 421; for the second, *Archæological Journal*, xxxiv. 212.

THE LONDON COUNTY COUNCIL.

The weekly meeting of this Council was held at Spring-gardens on Tuesday, Mr. W. H. Dickinson (the Chairman) presiding.

Loans.—The following loans were granted :—Lewisham District Board, 1,300*l.* for brick and sewer work ; St. Pancras Vestry, 16,710*l.* for brick, sewer, and wood-paving works ; Battersea Vestry, 17,124*l.* for erection of stabling ; Hackney Vestry, 10,000*l.* for disinfecting station, &c. ; Kensington Vestry, 18,000*l.* for wood-paving works ; St. Marylebone Guardians, 9,000*l.* for additions to workhouse ; School Board for London, 150,000*l.* for schools, &c.

Rotherhithe Tunnel.—The Bridges Committee reported that, under the Thames Tunnel (Rotherhithe and Ratcliffe) Act, 1890, the Council was authorised to construct a tunnel between Rotherhithe and Ratcliffe, together with several roads and widenings and approaches. It would be first necessary to proceed with the acquisition of property, the estimate for which, including the cost of rehousing, reached a total of 846,750*l.* The Committee recommended :—"That the estimate to be submitted by the Finance Committee of 846,750*l.*, for the acquisition of property required for the purposes of the Rotherhithe Tunnel scheme, be approved, and that the Bridges Committee be authorised to incur expenditure on capital account up to that amount for the purposes of the scheme."

This was adopted, after an amendment to defer the matter for a year had been negatived.

Electric Generating Station.—The Highways Committee recommended :—

"That the Council do in connexion with the establishment of a generating station for the London County Council Tramways, seek powers in the next session of Parliament to acquire the St. Matthew's girls' school premises adjoining the Camberwell tramway depot, and that a clause be included in the Bill to provide that improvements made in the land in question after the 16th October, 1900, when the proposal to acquire such land was made public, shall not be taken into account in assessing compensation, if the improvements be made with a view of obtaining or increasing the compensation payable by the Council."

This was agreed to.

Improvement Schemes.—The Improvements Committee submitted a list of eleven public improvements for which Parliamentary sanction had been obtained. It was, the Committee remarked, very desirable that ten of them should be undertaken and carried out at the earliest possible moment, and as soon as the Council approved the estimates the necessary steps would be taken for the service of notices to treat upon the owners of the property to be acquired for the ten improvements in question. The Committee, therefore, recommended :—

"That the estimates of 660,750*l.*, 227,800*l.*, 92,400*l.*, 5,200*l.*, 6,000*l.*, 10,450*l.*, 171,300*l.*, 46,900*l.*, 41,200*l.*, and 45,030*l.* (amounting in all to 1,307,030*l.*), submitted by the Finance Committee in respect of the following ten improvements :—(1) Mare-street, Hackney ; (2) Goswell-road ; (3) St. John-street, Clerkenwell ; (4) Blackstock-road, Islington ; (5) Archway-road, Islington ; (6) Kentish Town-road ; (7) Nine Elms-lane ; (8) Battersea-rise ; (9) Blackheath-road, Blackheath-hill, and New-road ; and (10) High-street and Gardener's-lane, Putney, be approved ; and that the Improvements Committee be authorised to incur expenditure on capital account up to those respective amounts for the purpose of the ten improvements in question."

The recommendation was adopted.

It was also resolved, on the recommendation of the Public Control Committee, to sanction an expenditure of 5,515*l.* in the erection of a weights and measures office and coroner's court at Clapham.

Holborn to Strand—Architectural Features.—With regard to this scheme the Improvements Committee reminded the Council that the suggested designs for the elevations of the buildings to be erected fronting on the Strand and on the crescent road to be formed between Wellington-street and Clement's Inn would be exhibited at the Gallery of the Royal Society of Painters in Water Colours, at No. 5A, Pall Mall East, from Friday, October 26, to Saturday, November 3 (inclusive). The Committee added : "We have now the pleasure of reporting that Mr. R. Norman Shaw, R.A., has readily accepted our invitation to advise upon the designs in association with the Council's architect, but has expressed his desire not to accept any fee, as he states that he is anxious to place his services at the disposal of a body engaged in the congenial occupation of beautifying the architecture of the city in which one dwells."

This was adopted, as was a further report, setting out a scheme for rehousing 3,700 persons dispossessed of their homes by the improvements. The accommodation for these persons will be provided as follows :—On Duke's-court site and Marquis-court site, the corner of Kemble-street and Drury-lane (799) ; on Reid's brewery site (1,681) ; on the Herbrand site (680) ; and on the Millbank site (290).

With regard to St. Mary-le-Strand and St. Clement Dane's churchyards, the Council accepted the tender of the London Necropolis Company in 2,258*l.* for removing the human remains and reinterring them at Woking.

St. Martin's Church—Important Proposal.—The Improvements Committee reported that the Vestry of St. Martin-in-the-Fields had submitted a proposal for the widening of St. Martin's-place by the alteration of the steps in front of St. Martin's Church, and they had asked the Council to contribute part of the cost of the work. The steps had been in a dilapidated condition for some time, and owing to their condition and position were the cause of frequent accidents to pedestrians. The Vestry had agreed with the church authorities for the reconstruction of the steps in such a way as to remove the landing on the west side of the portico and to lessen the width of the landing on the south side. A continuous flight of steps would lead from the western front of the portico to the footway of St. Martin's-place, and the effect of the abolition of the landing would be to widen the footway to about 9 ft. The Committee regretted that it was not possible at the present moment to increase the width of the carriageway, but any increase in the width of the thoroughfare at this part, whether carriageway or footway, must be of great advantage to traffic generally. The Committee quite agreed with the Vestry as to the urgency of the work, and approved of the action taken by them in the matter. They considered that the Council might reasonably contribute one-third, not exceeding 270*l.*, of the net cost of the scheme which the Vestry propose to adopt, and recommended—

"That the estimate of 270*l.* submitted by the Finance Committee be approved, and that the Council do contribute, on the usual conditions, one-third of the net cost of the reconstruction by the Vestry of St. Martin's-in-the-Fields of the steps in front of St. Martin's Church in such a way as to increase the width of the footway on the eastern side of St. Martin's-place to about 9 ft., as shown upon the plan submitted by the Vestry on July 14, 1900, such contribution not to exceed the sum of 270*l.*"

Mr. Shaw Lefevre moved the following amendment :—"That the report be referred back, with instructions to take expert opinion as to the architectural effect of the proposed alteration, and to request the Vestry meanwhile to take no further action for carrying out the work." On a show of hands the amendment was adopted.

Art Gallery for Whitechapel.—The Theatres and Music Hall Committee reported having considered plans of the Whitechapel Art Gallery submitted by Mr. C. H. Townsend on behalf of the trustees, who intend applying for a music licence for the ground floor of the building, at the coming session. The gallery is situated in Whitechapel High-street. The premises have been erected for the purpose mainly of picture exhibitions, and contain ground and first floor galleries, but when used for public purposes under the licence it is proposed to shut off the lower gallery from the upper one by means of iron doors at the foot of the stairs. Seating accommodation will be provided for 622 persons. The site does not comply with the regulations, as out of a total boundary of 414 ft., 42 ft. front to High-street, 8 ft. to Angel-court, a narrow cul-de-sac, 20 ft. to an open private yard with a gateway to Osborn-street, and the remainder is enclosed by other buildings. The only public exit from the hall is at the south end, where two doorways, having a total width of 11 ft. 2 in., open into a vestibule 16 ft. 6 in., and from this vestibule, which is 22 ft. long, two outer doorways having a total width of 11 ft. open into High-street. The control of the Art Gallery is vested in trustees and is regulated by a scheme approved and established by the Board of Charity Commissioners. Having regard to all the circumstances of the case, the Committee recommended :—

"That Mr. Townsend be informed that the Council will be prepared to grant a certificate under section 12 of 41 and 42 Vict., cap. 32, in regard to the Whitechapel Art Gallery, on being satisfied that the usual conditions have been complied with."

This was carried.

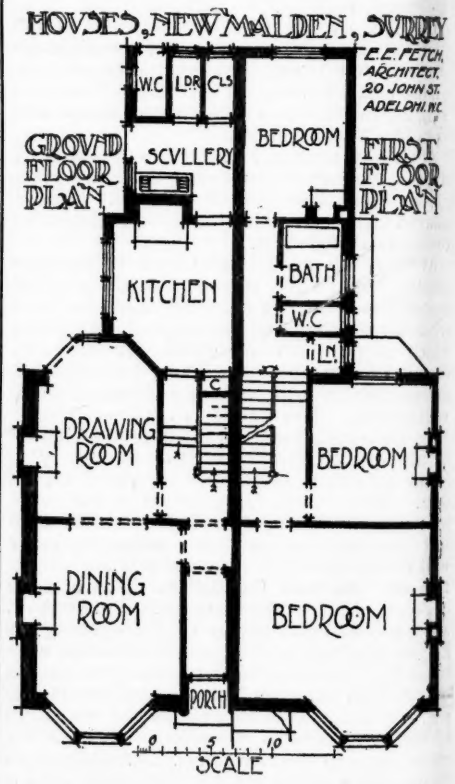
Temporary Structures.—In connexion with the march of the City Imperial Volunteers through London on the 27th inst., the Building Act Committee reported that, in view of the probability of temporary stagings being erected for the accommodation of sightseers, they had thought it advisable, following the practice which was adopted at the time of the Diamond Jubilee procession in 1897, to issue to the occupiers of premises on the line of route notices calling attention to the fact that it is unlawful to erect such temporary structures without first obtaining the Council's licence in respect thereof ; and also calling attention to the necessity of balconies, intended to be used, being properly shored up to prevent risk of accident.

They had also made special provision for dealing promptly with any structures which may be found to be dangerous.

The report was adopted, and after transacting other business the Council adjourned for a week.

HOUSES AT NEW MALDEN, SURREY.

These two small houses have been recently erected in the Pressburg-road. The accommodation provided consists of two sitting-rooms, five bedrooms, and the usual offices. In the architectural treatment of the elevations a design in harmony with rural surroundings has been adopted, in preference to the stereotyped suburban villa house, and with regard also to the effect of light and shade produced in bright sunshine by the boldly projecting bays, gables, and eaves, upon the grey, broadly treated



rough-cast, while the red brickwork of the ground story and the white paintwork of the windows and entrance should give the houses a cheerful aspect even on dull, grey days, of which we have so many in this climate.

It is proposed to erect more houses of a similar type in the locality, which is rapidly becoming an important suburb of Greater London.

Mr. G. B. Willett has executed the work from the designs and under the superintendence of the architect, Mr. Ernest E. Fetch, of London.

Workmen's Dwellings, Liverpool.—A Local Government Board inquiry was held on the 16th inst. in reference to an application made by the Liverpool Corporation to borrow 30,000*l.* for the erection of ninety-five workmen's dwellings, on the tenement principle, in Kempston-street, Gildart-street, Constance-street, and Fontenoy-street, which were included in one of the insanitary areas, where condemned property had been demolished.

APPLICATIONS UNDER THE 1894 BUILDING ACT.

THE following applications under the 1894 Building Act have been dealt with by the London County Council. Those applications to which consent has been given are granted on certain conditions. Names of applicants are given in brackets. The buildings are new erections unless otherwise stated :—

Lines of Frontage.

Finsbury, East.—An electric central station at Oak Wharf, City-road, St. Luke's, at the corner of Graham-street, so far as relates to the omission of the detached office building next the City-road basin (Mr. H. B. Rennie for the County of London and Brush Provincial Electric Lighting Company). —Consent.

Wandsworth.—The retention of two projecting pilasters with bases, and a plinth, in front of the Royal Oak beer-house, East Hill, Wandsworth (Mr. T. W. Biggs for Messrs. Stansfeld & Co., Limited). —Consent.

Chelsea.—The erection of buildings on the south-west side of Park-walk, between Chapel-street and Winterton-place, Chelsea, so as to allow the land required to be dedicated to the use of the public for the purpose of widening Winterton-place.—Refused.

Lewisham.†—A dwelling-house, with bay windows on the south side of Sydenham Park, Sydenham, next No. 50 (Mr. G. Tolley for Mr. E. C. Christmas). —Refused.

Lewisham.—Erection of five houses with one-story shops on the West side of High-street, Lewisham (Messrs. Sills & Leeds for Messrs. W. G. Larke & Sons).—Consent.

Lewisham.—Erection of one-story shops on the west side of Catford Hill, Lewisham (Mr. A. Stuart for Mr. H. T. Holdron.—Consent.

Deptford.—Erection of one-story shops, with bay windows over, on part of the forecourts in front of Nos. 462 and 464, New Cross, Deptford (Mr. J. Webster).—Consent.

Woolwich.—Erection of one-story shop, with wooden balustrade over, on part of the forecourt of 148, High-street, Plumstead (Mr. T. Bradshaw).—Consent.

Hackney, Central.—An addition to a one-story building at the rear of 24, Southgate-road, Kingsland (Mr. G. Flaxman for Mr. E. Madge).—Consent.

Width of Way.

Poplar.—Three blocks of dwellings on the east and west sides of Ann-street and the west side of Brunswick-road, Poplar, respectively. (Mr. J. Briggs for Housing of the Working Classes Committee of the London County Council).—Consent.

Southwark, West.—Block of artisans dwellings on the north side of Sumner-street, Southwark, to extend over Martagon-place. (Mr. F. H. Jackson for the City of London Electric Lighting Company).—Refused.

Chelsea.—One-story lavatories in the playground of the Roman Catholic Schools for Girls, Chelsea. (Messrs. J. Brown & Son).—Consent.

Projections.

Islington, East.—The retention of a projection (an illuminated sign) at the Montague Arms public-house, Benwell-road, Islington (Mr. W. H. Fisher for Mr. J. C. Truman).—Consent.

Finsbury, Central.—Retention of an iron and glass shelter at the entrance to the Clerkenwell Town Hall, Rosebery-avenue, Clerkenwell (Mr. A. G. Langdon for Vestry of Clerkenwell).—Consent.

Greenwich.—A projecting lamp in front of the Three Tuns public-house, No. 18, London-street, Greenwich (Mr. J. R. Johnston for Messrs. Taylor, Walker, & Co.).—Consent.

Kensington, South.†—An iron and glass covered way in front of No. 14, Upper Phillimore-gardens, Kensington (Messrs. Shuffrey & Co. for Mr. B. L. Ronald).—Consent.

Strand.—An oriel window at the first-floor level of a three-story building on the north side of Horse and Dolphin-yard, Soho (Mr. A. Ventris for Board of Works for the Strand district).—Consent.

Strand.—An iron and glass shelter at the entrance to Mr. Lowenfeld's theatre next the Lyric Theatre, Shaftesbury-avenue, St. James's (Mr. L. Sharp for Mr. Lowenfeld).—Consent.

Marylebone, West.†—A balcony at the first-floor level in front of 12, Marble-arch, Edgware-road, St. Marylebone (Mr. A. E. Nightingale for Mr. T. C. Reece).—Refused.

Marylebone, West.—Re-erection of balcony at the first-floor level in front of 42, Montagu-square, St. Marylebone (Mr. F. W. Hunt for Honourable Miss Powys).—Refused.

Lines of Frontage and Width of Way.

Bethnal Green, North-East.—An extension of the periods within which the re-erection of buildings on the site of the Arabian Arms public-house, Nos. 222 to 232 (even numbers only), Cambridge-road, and Nos. 2, 4, 6, and 8, Bishop's-road, Bethnal Green, was required to be commenced and completed (Messrs. H. Dawson & Son).—Consent.

Line of Frontage and Space at Rear.

Islington, West.—Bakehouse with a room and store over at the rear of 80 and 81, Goodinge-road, Holloway (Messrs. Higgs & Rudkin for Mr. W. Ritter).—Refused.

Width of Way, Lines of Frontage and Space at Rear.

Lambeth, North.—Buildings on the site of 136 to 146 (even numbers only), Kennington-road, and 67 and 68, Walnut Tree-walk, Lambeth (Messrs. Waring & Nicholson for trustees of the Lambeth Walcot Charity Estate).—Refused.

Adaptation of Footways for Carriage Traffic.

Holborn.—Widening and adaptation for carriage traffic of Richbell-place, Lamb's Conduit-street, Holborn (Messrs. Lander, Bedells, & Crompton).—Consent.

Norwood.—Widening and adaptation for carriage traffic of a portion of Benton's-lane, Gipsy Hill, West Norwood (Messrs. Barlow & Roberts).—Consent.

The recommendations marked † are contrary to the views of the Local Authorities.

NEW WORKING RULES BETWEEN LONDON BUILDERS AND STONEMASONS.

We have received from the Secretary of the London Master Builders' Association copies of the rules now in force as between their Association and the Carpenters' or Joiners' Societies, the National Association of Operative Plasterers, and the Operative Stonemasons' Society. The two first-named sets of rules were agreed to under the dates April 19 and March 16 respectively of the present year; those concerning the Stonemasons' Society are of later date (July 16), and one of the new rules (No. 2) has not yet come into operation. Rule 10, which is the other new one, practically puts the provision for a "Conciliation Board" on much the same footing as in the case of the carpenters and the plasterers. The following is the text of the two new rules in the agreement between the London Master Builders' Association and the Operative Stonemasons' Society; the word "employer" standing throughout for a member of the Builders' Association, the word "workman" for a member of the Stonemasons' Society:—

"2. That the present rate of wages shall be advanced one halfpenny per hour from Saturday, November 3, 1900.

* * * * *

10. (A.) For the adjustment of all disputes and to avoid stoppage of work, it is agreed that upon a difference arising between an employer or upon the works of an employer and any of his workmen, from any cause whatever, notice shall be given by the Association or Society of the complaining party to the Association or party representing the other side, and the subject-matter of dispute shall thereupon be referred to the Board of Conciliation, who shall be summoned within seven days, and, if practicable, shall give their decision within the next six working days, proceeding in the following manner:—

(B.) For all purposes of the foregoing rules the Board of Conciliation shall consist of three members nominated by the employers and three by the workmen. Each party shall send to the other within one week from the date of signing these rules, and within one week from January 1 in each year, the names of six persons from whom three shall be selected to act as their representatives on the Board of Conciliation for the current year ending December 31, and in the event of the death or resignation of any member, either party shall appoint another member within one week, notice being given thereof. The number of representatives of the employers and of the workmen on the Conciliation Board shall always be equal, and shall be so maintained during the sitting.

(C.) The Board of Conciliation so constituted, if unable to agree, shall make application to the Board of Trade under the 'Conciliation Act, 1896,' or apply for the appointment of a person to act as a conciliator. The Board of Conciliation shall have power to decide all questions arising between the employer and the workmen, including any questions between one trade and another as regards demarcation of labour or other matters, provided that for the decision of any question involving claims or rights of other sections of the building trades a Joint Conciliation Board shall be constituted of the three representatives nominated by each trade involved and by a similar number of representatives of the employers, so that members of the Joint Conciliation Board may be specially represented on such Board, and so that the numbers of representatives of the employers and the workmen on such Joint Conciliation Board shall be equal and be so maintained during the sitting.

(D.) A Joint Conciliation Board shall have the like powers as a Conciliation Board and be regulated in the same manner.

(E.) The Conciliation Board or a Joint Conciliation Board shall have power to make such rules and regulations for the transaction of business as they may approve.

(F.) In the event of an application being made to the Board of Trade or a person being appointed as conciliator, the decision of such person or the Conciliation Board shall be final and binding on both parties."

Copies of all three sets of rules, we may add, can be obtained from the Secretary of the London Master Builders' Association, 31 and 32, Bedford-street, Strand, price 2d. each, or 1s. 6d. per dozen copies.

Books.

Injectors: Their Theory, Construction, and Working. By W. W. F. Pullen, A.M.Inst.C.E., M.I.M.E. The Technical Publishing Company, Ltd., Manchester. 1900. Second Edition.

So far as we are aware, the only treatise devoted exclusively to a consideration of the injector is that written by Mr. Pullen, of which the second edition is now published. In the arrangement of his book, the author has departed from the practice adopted by most writers, in the respect that historical references are reserved until theoretical points have been fully discussed. The introductory chapter contains an explanation of the action of the steam injector, and of the apparently paradoxical results obtained with it in practice. Following this introductory matter there is a mathematical investigation relative to the efflux of steam under different conditions, to the limits within which the injector is capable of working, and to the weight of water which can be delivered through cones of various diameters with steam at varying pressures. In connexion with the last-mentioned point, a set of twenty-five curves is given in two diagrams, from which the reader may see at a glance what is the proper size for an injector to supply steam boilers of from 0 to 1,600 horse-power, when steam pressure varies from 10 to 140 lbs. per square inch. Mr. Pullen directs attention to a somewhat curious point relative to the diameter of the delivery cone. Thus, in the case of an injector designed for a maximum quantity of feed-water per pound of steam, the maximum feed will theoretically require a delivery cone of maximum diameter. But if the injector be regulated so that a minimum quantity of feed-water is delivered per pound of steam, the delivery cone is not required to be so large as under the former condition of working; and if it remains constant (as it always does in practice) the cone cannot be full of water. This conclusion, as the author points out, "appears antagonistic to the general laws of hydraulics, where the pipe must be full before a reduction of velocity is accompanied by a corresponding increase in pressure." Practical experience seems to suggest the explanation that the steam is not entirely condensed in the combining cone, and that this, together with vapour given off from the water at the temperature of delivery, may produce a pressure in the delivery cone surrounding the jet of water sufficient to ensure steady motion. Nevertheless it appears desirable that regulation of the steam and water cones should be accompanied by corresponding regulation of the delivery cone. As Mr. Pullen remarks, this has not hitherto been attempted in practice.

Most of the remaining chapters are devoted to the description and illustration of different forms of injectors, and in the present edition all the leading types of steam-injectors are included, though it must not be supposed that every individual maker is mentioned by name. A few interesting notes are to be found with regard to air-injectors and air-ejectors, as used for forced draught, or for producing a partial vacuum. The water-injector, in which water forms the motive power, is also discussed. Apparatus of this kind is employed at the Barry Docks for pumping out water when dock gates have to be examined or repaired. The injectors at that place are supplied with water at 700 lbs. per square inch, and they deliver about 5,000 gallons of water per hour. The maximum lift of the injectors is about 10 ft., and the height to which water is forced above the injectors is 35 ft.

The book would be improved by a separate chapter dealing with practical applications of injectors and apparatus of a like nature. It is true that some mention is made by the author of different purposes for which injectors and ejectors may be used, but the references in question are mixed up in the historical sketch constituting the concluding chapter, and there are many methods of utilising these useful and beautiful appliances which the author does not mention in any way. Taking the work as a whole, it may be said to present a complete and well-reasoned exposition of the subject.

The Reclamation of Land from Tidal Waters. By Alexander Beazeley, M.Inst.C.E. London: Crosby Lockwood & Son. 1900.

In the compilation of this book we imagine the author must have had a somewhat ungrateful task. He was invited to rewrite a useful work by the late Mr. J. Wiggins, F.G.S., on "The Practice of Embanking Lands from the Sea," and it was stipulated that the subject should be brought "thoroughly up to date, and be of a severely practical character." The method adopted by Mr. Beazeley is to give copious quotations from the work mentioned, generally beginning with some such phrase as, "Mr. Wiggins mentions," "Mr. J. Wiggins lays great stress," "Mr. John Wiggins has laid down some rules," &c. In addition to these lengthy extracts there are others from the writings of various authorities, whose opinions are sometimes at variance one with another. The result is not particularly satisfactory. There is so much "Wiggins" that one begins to acquire confidence in his teaching, and to experience the desire for more. The author has also quoted so much from other authors, that one likewise feels tempted to refer to their respective works for further information and guidance. Mr. Beazeley has evidently been at

great pains to collect the most trustworthy opinions and facts, although some of them are by no means new; and it is probably owing to the conscientious manner in which these data are presented, to the exclusion of his own personal experiences, that one fails in great measure to recognise in him a leader and a guide.

Apart from these unfortunate attributes it must be acknowledged that the volume contains a large amount of very useful information, dealing with the most salient features of land reclamation. The nature and suitability of the site, different modes of embankment and drainage, maintenance, warping, and after cultivation all receive due attention; and numerous notes and references are appended, so that those desiring further details may see at a glance where such may be obtained. Regarding groynes and protective outworks, the author remarks: — Substantial and well-constructed though it may be, and however great the care bestowed upon due employment of the means needful for keeping it in proper condition and repair, the bank is strong so long only as its foundation remains secure. . . . . There is no feature of greater importance in connexion with the dykes than the projecting works, or groynes." In view of these opinions, it seems a little disproportionate that, whilst the "bank" should receive treatment covering 114 pages, the all-important subject of protective works should be dismissed in 17 or 18 pages. Something more might very well have been said about the latter, and detailed examples of recent work would have been especially valuable. The chapter on Legal Requirements could certainly be omitted without impairing the value of the volume as an engineering handbook, and without detracting much from its general usefulness, for reclamation works are never likely to be undertaken unless under proper legal advice. The index is of somewhat meagre proportions; it contains no reference to several important modern works mentioned in the text, and, curiously enough, no place has been found in it for Mr. Wiggins, the main source of inspiration.

The Chemistry of Materials of Engineering. By A. Humboldt Sexton. Manchester: The Technical Publishing Company, Limited. 1900.

At the commencement of the nineteenth century chemistry was the hobby of a few eccentric students of science, and occasionally served as a source of amusement for a wealthy audience; at its close, chemistry is taught in every school, and is of recognised value in every art and industry. The artist may paint beautiful pictures, but they will soon fade if he work with pigments which readily undergo chemical change under atmospheric influences; the engineer may construct well-devised machinery, but his ingenuity will be unavailing if his materials contain chemical impurities which influence prejudicially the strength of those materials; the architect may erect soul-inspiring edifices, but his skill will be but of transient value if he build with materials of feeble chemical stability.

The ancients and mediævalists learned to paint and construct with durable materials through knowledge gained by experience, such knowledge being handed down from generation to generation. But in transmission important facts gradually became lost in oblivion and had again to be learned by costly experience. "Experience teaches fools," says an old adage, and as it is possible to acquire the knowledge that the hand will not retain its normal condition under the influence of the heat emitted by glowing carbon without gaining practical experience by actually thrusting the hand into an incandescent bed of fuel, so is it possible, by a study of the laws which govern changes of form in matter, to erect durable structures without previous experience in the erection of edifices of an unstable character. That is one of the primary advantages of scientific knowledge and of the power of scientific observation: it enables us to avoid troubles which otherwise would not be avoided until knowledge had been gained by painful practical experience.

Professor Sexton's book is designed to assist the engineer in becoming acquainted with the chemical properties of the principal materials used for engineering construction; and as these materials are identical with those used by the builder, the book will, to a lesser extent, be of service to those engaged in building construction. We say to a lesser extent because thirteen of the twenty-five chapters into which the book is divided are entirely devoted to iron and steel, whilst the more important building materials, stone, brick, mortar, and cement are allowed only three chapters altogether, and are very superficially treated. The extent to which Portland cement is used by engineers certainly entitles it to greater consideration than it receives in the few lines here devoted to it, and we find no mention whatever of selenitic mortar or cement, although gypsum itself is briefly described. Other chapters deal with copper, and the more common metals and alloys, with fuel, water, lubricants, and paints and varnishes; whilst the final chapter briefly describes the characteristics of materials of minor importance, such as emery, glue, and leather.

The book will meet the requirements of many men in this country, for engineers and builders who possess very little knowledge of chemistry (we should not like to venture a statement as to their number) will find a large amount of useful information here set forth in a clear and simple style. In Germany the book would have less chance of success, because German engineers and builders learn at school most of the information to be found in it. The rising generation of British builders and engineers will also learn during their early training all, and we hope more than all, that this work can teach them regarding the chemistry of constructive materials. Meanwhile the book may be of much service to those who have not received a modern education, although the inexcusable negligence of the author in failing to provide an index has greatly detracted from its value for reference purposes.

Incidentally, Professor Sexton, writing as a metallurgist, makes a complaint regarding the manner in which engineers and architects draw up their specifications for steel girders. He says:—

"There is, unfortunately, no doubt that engineers often specify steel to be made by a particular process from habit or fancy, without any clear idea as to why the metal made by that process should be better than that made by any other. Such specifications have lowered engineers very much in the eyes of practical metallurgists, and have made the latter think that too often the former do not know exactly what they want. Architects are, perhaps, even worse sinners in this respect than engineers, it being no uncommon thing for girders and other articles of structural steel to be specified to be made of 'mild steel' without any restriction as to composition or provision for testing."

We fear that practical metallurgists are sometimes lowered in the eyes of engineers and architects by the condition of the article the metallurgist sends out as a finished girder. Reputable metallurgists never endeavour to sell unsound girders, neither do reputable engineers or architects fail to examine the girders they employ for constructive purposes. Architects are quite justified, in the present condition of chemical science, in neglecting to give much attention to the chemical composition of the steel they use, and in relying almost entirely upon physical tests. A girder may be made of metal of satisfactory chemical composition and yet be a very unsatisfactory constructive material. In relation to the use of metal girders a knowledge of chemistry is of value as an aid to the selection of the best method of preserving the girder from corrosion, and in forming a judgment as to the positions in which the metal may with advantage be used; but chemical tests must not be used as a substitute for physical tests.

With regard to Professor Sexton's statement that architects commonly neglect to make any provision for testing, we can only say that this is contrary to our experience. In every trade and every profession a certain proportion of unqualified men are to be found, but we should be sorry to regard their sins of omission or commission as common to the trade or profession they may represent.

Archæological Survey of Egypt: Eighth Memoir. The Chapel of Ptahhetep and the Hieroglyphs. By N. de G. Davies. London: Kegan Paul & Co.; and Offices of the Egypt Exploration Fund. 1900.

The great interest of this volume of the Archæological Survey publications, to artists at least, lies in the outline copies of the representations of birds and animals in the interior of the Chapel of Ptahhetep at Saqqareh. The originals are in relief and coloured, though the remains of the colour are stated to be exceedingly fragmentary; but the drawings of the birds, though only the outlines of most of them is given, are remarkable examples of powerful indication of structure and character by means of flat profile representations. It is curious how much they remind one of the style of some of Blake's decorative animals in the margin of the plates to the Book of Job. There are also various drawings of pottery and instruments from the hieroglyphs, and an elaborate drawing of that singular architectural adornment of the Egyptians, the false door in the wall of the chapel, together with some restorations of its colour design, which apparently can still be pretty clearly made out.

Some photographs from the actual walls, on a smaller scale than the drawings, show the general effect and character of these singularly interesting representations of ancient hunting and farm scenes.

Chippendale, Sheraton, and Hepplewhite. Furniture Designs. Reproduced and arranged by J. Munro Bell. London: Gibbings & Co. 1900.

This is a volume in which a number of the plates from the furniture books of Chippendale, Sheraton, and Hepplewhite, are reproduced, so as to bring together the typical designs of these three celebrated eighteenth-century cabinet-making artists. It is a very useful publication, inasmuch as the original books are not easily to be had, and the main contents of the three can here be studied together.

We have on a former occasion gone at some length into the merits and demerits of Chippendale and Sheraton furniture, from the artistic point of view, and it is hardly worth while to open up the subject again in connexion with this re-issue of their designs. We may merely observe that the modern admiration for Chippendale has been a very undiscriminating and uncritical one, and fashion has led to the acceptance of good and bad from him alike. His workmanship is always first-rate and conscientious, and his faculty for shaping and giving contour to objects like chests of drawers, cupboards, and tables, led him to produce works remarkable both for elegance and for the fine finish of workmanship. On the other hand, many of his much-lauded chairs are very bad in design, both on structural and æsthetic grounds. There are very few of those given in this collection which any artist of the present day would admire, if they were produced as modern works; and his so-called "Chinese" furniture designs are, as far as design goes, little better than gimcrack. As a designer, Sheraton was on the whole superior to Chippendale, especially in chairs; the only point in which Chippendale is undoubtedly better is in his drawers and cupboards with modelled contours, which, when not spoiled by too much carving, are more refined and out of the common than anything produced by Sheraton. In the main, however, the latter is a distinctly more architectonic designer of furniture; and several of the chair designs shown on plates 134-135 of Mr. Bell's reproduction are quite admirable.

Hepplewhite was not equal to the other two in the main; but in his designs for the less ornate classes of furniture, such as bedroom chests of drawers, &c., he showed excellent taste, and produced effective and characteristic furniture in a simple and inexpensive manner. Some of his sofas and settees also are very good.

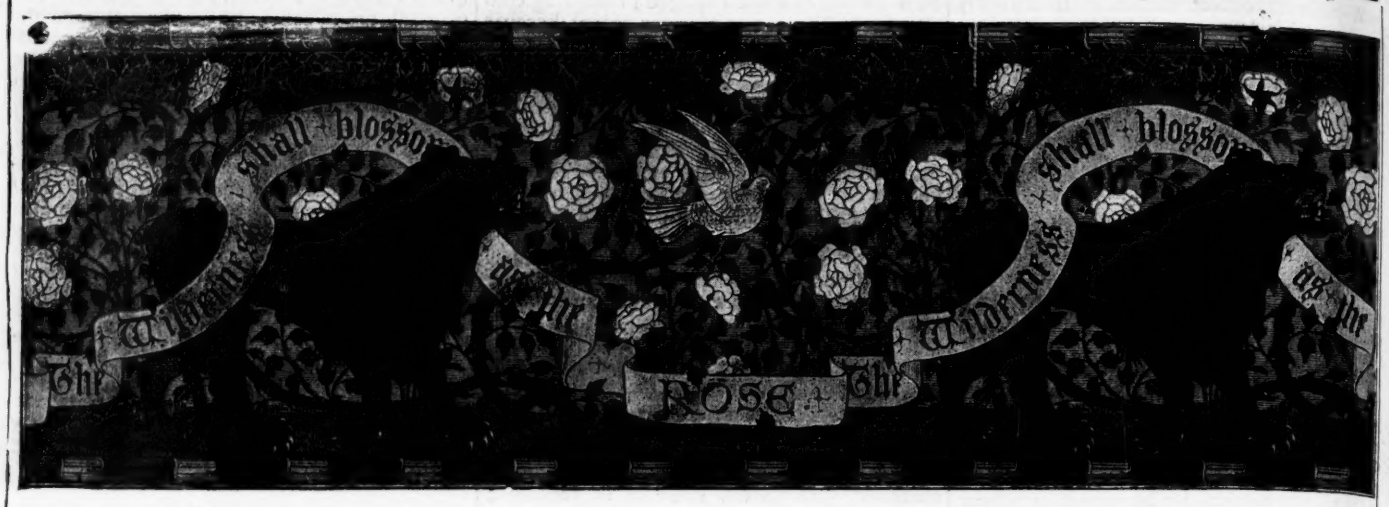
BOOKS RECEIVED.

French Architects and Sculptors of the Eighteenth Century. By Lady Dilke. (Geo. Bell & Sons.)

A Digest of Cases Relating to the Construction of Buildings. By E. S. Roscoe. Fourth Edition. (W. Clowes & Sons.)

Churches and Chapels; their Arrangements, Construction, and Equipment. By F. E. Kidder. Second Edition. (New York: W. T. Comstock.)

St. Jude's Church, Old Bethnal Green-road.—Towards the renovation of the fabric, which is in a dilapidated state, the Ecclesiastical Commissioners have agreed to contribute 300*l.*, provided that a further sum of 700*l.* is raised within a certain time. The church was built in 1845-6, after Clutton's designs, and serves a thickly-populated district. The organ, by Crang & Hancock, and formerly in St. Vedast's, Foster-lane, was rebuilt by Walker in 1853.



The "Lion" Frieze. Made by Messrs. Jeffrey & Co. Designed by Mr. Walter Crane.

Illustrations.

THE GRAND PALAIS DES BEAUX-ARTS, PARIS.

WE give this week an illustration, from a photograph specially taken for the *Builder*, of the central portion of the eastern façade of the large Palais des Beaux-Arts at Paris, which at present reckons as part of the Great Exhibition just about to close, but which is, as we presume our readers will remember, a permanent building on the grandest and most monumental scale, which will in future be the site of the annual exhibitions of the Salon, and will probably also be used from time to time for great Government fêtes and celebrations.

Several designs were made for this building before the Government were satisfied; we published in our issue of August 1, 1896, a façade for it which was designed by M. Loviot, and was of great merit, but had not the monumental and dignified character of the building actually carried out, the joint design of three architects, MM. Thomas, Louvet, and Deglane.

The façade is of such length that it is impossible to get a photograph which will give any idea of the whole, except in a very foreshortened perspective. The present illustration shows the great central portico, and on either side of it the commencement of the long flanking colonnades, standing in front of the deeply shadowed wall which is set back a considerable distance from the line of the colonnade. The façade is carried out in an exceedingly white stone *(calcaire grossier)*, which has a beautiful effect on a bright day.

It is to be regretted that the monumental unity of the design is spoiled by the large mass of glass roof which appears above the balustrade; but it was considered that no other method of roofing would ensure a sufficiency of light for the art galleries.

The building is of immense size; internally it is in fact two buildings, the western portion forming a separate set of galleries, with its own great hall and staircases, to be used for separate exhibitions; though the whole exterior has been cleverly conbined into one design, which gradually changes its character on the flanks of the building, so that the western and eastern fronts have quite a distinct character.

Some of the details, such as the fillets drooped over the blocking, and the immense central ornament on the circular pediment, will appear very *rococo* to English eyes, in the present phase of architectural feeling; they certainly cannot be defended on grounds of pure taste; and there seems to be rather a confusion of scale in some places. But it is a building to be judged in itself and on the spot. The effect of its vast scale, the boldness of its conception, its crowd of colossal sculptures, and the splendid execution of every portion of the work, leave the actual spectator little in the mood to be too critical.

DESIGNS FOR FRIEZE AND WALL PAPERS.

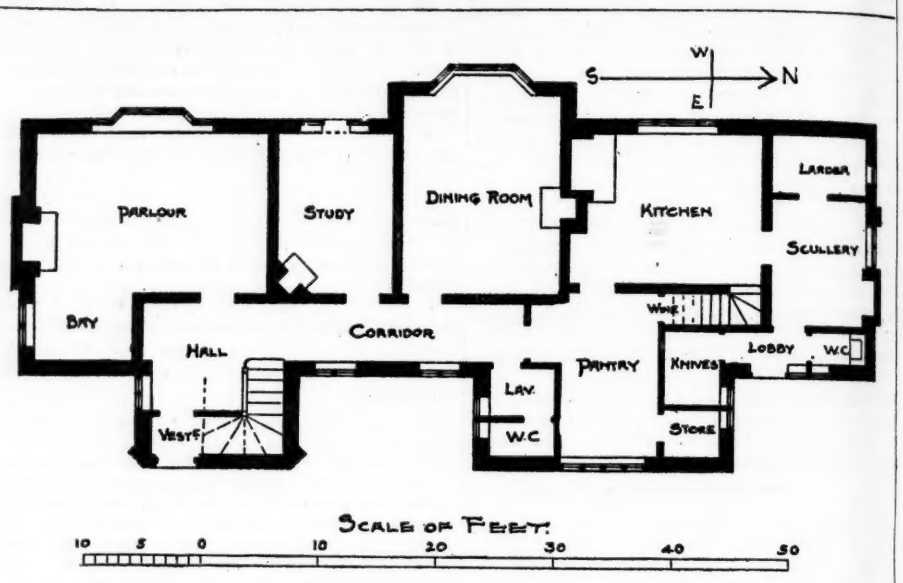
THE frieze and wall papers illustrated in the plate are manufactured by Messrs. Jeffrey & Co., the well-known firm at Islington, and form part of their exhibit in the Paris Exhibition.

The "Sylvan" frieze, designed by Mr. Stephen Webb, is intended to be executed in green and ivory for a drawing-room; though we are not sure that we should not prefer it simply in relief.

The "Cockatoo and Pomegranate" paper, designed by Mr. Walter Crane, is an embossed leather paper, treated in silver decorated in coloured lacquers, by hand, upon a background of turquoise green.

The "Roseneath" paper is designed by Mr. Sidney G. Mawson.

We append also an illustration of the "Lion" frieze designed by Mr. Walter Crane, and which runs over the whole of the exhibits.



House at Cley, Norfolk. Plan.

HOUSE AT CLEY, NORFOLK.

THIS house, now nearing completion, stands on the slope of the hill overlooking the valley of the Glaven, and commands an extensive and varied prospect of a (fortunately) but little-known part of Norfolk.

It has been treated in the local manner with flint walling, brick dressings, and pantile roof, and incorporated with it is much of the material from an older house in the village, lately taken down. The dining-room will be panelled with old oak from floor to ceiling, and the other rooms treated in character. The outbuildings and stables will adjoin the house on the north side, and gardens and terraces are being laid out on the south and west.

The builder is Mr. Charles Tuthill, of Fakenham.

E. GUY DAWBER.

ST. STEPHEN'S NATIONAL SCHOOLS.

THESE views illustrate a portion of the back and of the interior of these schools. The drawing was exhibited at the last Royal Academy Exhibition. The work shown is an extension equal to more than doubling an old National School built in 1858. For the purpose of this increase, three houses adjoining have been absorbed, while an extra story has been built over the old school. In this way the numbers of the scholars have been raised to 866—as infants 310, girls 286, boys 270—as compared with an overcrowded accommodation on an average attendance of 318.

The undertaking was a formidable one for the parish, and occupied four years—November, 1894, to November, 1898—when the last section, the new story over the old building, was opened. Actual building work was commenced in May, 1896, and the first opening took place in November, 1897, when an account of the building and a list of the firms employed was given, as also in November, 1898, when the whole was completed.

It is only necessary to add that the work shown in sketches made on the spot is all in stock bricks with red brick arches and copings. The windows have wood frames with iron casements. The roofs are covered with green slates. The front elevation, also in stock bricks with stone dressings and red brick chimneys, faces to the wide open area of the Great Western Goods-yard and is seen from the main line at Westbourne-park station in a long distance view.

In the interior view the large arch shown carries the boys' corridor, the bull's-eyes over it lighting the upper part of the lofty corridor at this point, which is also the object of the light window on the back elevation at this level. The junction of the old and new corridors differing in widths and height is effected by a bay cross vaulted at a lower level.

The uppermost dormer seen in the back elevation is one of those that give sunshine and air to the boys' classrooms along the north front.

A determining point in the plan is the pass door of the two staircases at the first-floor level, affecting the levels of the ground-floor and mezzanine cloakrooms and providing a feature

of some interest in the elevation of the boys' and girls' entrances. The boys' schoolroom, of an L shape, covering the whole area of the first-floor of the old building, is the chief feature of the interior, but from convenience and for safety of exit, the two ground-floor rooms, marked in plan, have been adapted as a parish hall. Messrs. Rudd & Son, of Grantham, have been the contractors throughout, no clerk of works being employed. A. T. B.

THE "CASINE," CLONTARF, DUBLIN.

The "Casine," as it is called—probably the same word which is now written "Casino"—was built at Clontarf a little after the middle of the last century, from the designs of Sir Wm. Chambers, as a residence for Lord Charlemont.

The plan, as will be seen, is entirely symmetrical. The detail of the order employed is somewhat richer than that of any example of Doric given by Chambers in his work on the Five Orders.

The Casine was one of the buildings set by the Architectural Association of Ireland to be measured for their Travelling Studentship. The studentship was obtained by Mr. Henry Lyons for these drawings, with two other sheets of enlarged details and mouldings.

ARCHITECTURAL SOCIETIES.

Sheffield Society of Architects and Surveyors.—The annual dinner of this society was held at the Masonic Hall, Sheffield, on the 17th inst. The chair was taken by the President, Mr. Joseph Smith. After the loyal toasts had been honoured, Mr. Peter Maskall, the Vice-President (who was in the vice-chair), gave "The Lord Mayor and Corporation," and spoke of the schemes of public improvements which were before the Sheffield City Council. The toast was responded to by Mr. J. M. Furness (Chairman of Highway Committee) and Commander Scott. Mr. E. M. Gibbs proposed the toast of "The Royal Institute of British Architects." Mr. Charles Hadfield, in responding, said that the Institute deserved a sympathetic recognition from country members. Other toasts included "The Visitors," proposed by Mr. Edward Holmes and responded to by Judge Waddy; the "Surveyors' Institution," proposed by Mr. T. Winder and responded to by Mr. Frederick Fowler; "The City and Trade of Sheffield," and "The Sheffield Society of Architects and Surveyors," proposed by Professor Ripper and acknowledged by the President.

ENGINEERING SOCIETIES.

Yorkshire College Engineering Society.—A lecture on the "Organisation and Methods in Engineering" was delivered before the members of this Society, on the 15th inst., by Mr. Wilson Hartnell, M.I.M.E. He remarked that examples of order and method were to be found in the administration and working of the Yorkshire College, and, indeed, of all other successful human institutions. The finest examples of organisation were to be found in Nature, such as in the construction of plants or other living creatures, and, in fact, it was upon the arrangements of the parts of their structures that the idea of organisation was founded. From Nature also they had the most perfect examples of method, as in the manner in which buds were gradually developed, and perhaps the most perfect examples of classification were to be found in natural science, such as in botany. In the application of these principles to engineering works, however, though all were more or less organised, there was a great difference in the extent to which they were carried out. Of late years a great deal had been said in regard to the ability of their engineering works to maintain their position in the face of foreign competition, and it had been said that in other countries, especially in America, organisation and method had been carried out to a greater extent than in this country. This might or might not be true as a whole, but we had many highly organised works in this country, as, for instance, Messrs. Willans & Robinson's, at Rugby. Mr. Hartnell proceeded to describe the system in vogue at the works of Messrs. Marshall, Sons, & Co., of Gainsborough, where, he pointed out, the principles he referred to had been adopted with remarkable success. There was not, he said, a single works in Leeds to compare with the orderly, systematic manner in which these works, or those of Messrs. Willans & Robinson, of Rugby, were conducted. In concluding, he impressed upon his hearers, as the coming engineers of the twentieth century, the immense importance of organisation and method.—*Leeds Mercury.*

METROPOLITAN ASYLUMS BOARD.

An ordinary meeting of the Metropolitan Asylums Board was held on Saturday at the Board's Offices, the Embankment, Sir G. Goldsworthy presiding.

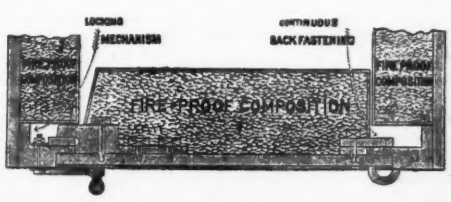
Joyce Green Hospital.—The Finance Committee recommended that application be made to the London County Council for a loan of 75,000*l.* on account of the cost of the erection, &c., of the Joyce Green Hospital, to be repaid by equal annual instalments of principal spread over a period of 30 years, at interest at the rate of 3½ per cent. per annum. After some discussion the matter was referred back to committee to see whether the period of the loan could be extended to fifty years.

Witham School.—On the recommendation of the General Purposes Committee it was agreed that, so soon as the Witham School is handed over to the managers for purposes in connexion with the work of the children's department, a cheque for 10,000*l.* be drawn to the South Metropolitan School District Board on account of the purchase of the whole of the property of that district.

TRADE CATALOGUES.

We have received from the Sanitary Lead-Lining and Pipe-Bending Company, of Cremorne Wharf, Lot's-road, London, S.W., copies of their most recent illustrated sheets and price-lists. The firm is principally engaged in the manufacture of Brighton & Venning's patent lead-lined cast-iron pipes and fittings for use as soil-pipes, drain ventilating-pipes, waste-pipes, &c. There can be no doubt whatever as to the advantages of these pipes and fittings; the lead is protected by the iron shell from external injury and from bending and sagging, and the iron is protected by the lead lining from internal corrosion. The question, however, arises whether, especially in junctions, the lead lining fits closely to the iron shell throughout; there seems a possibility of part of the lining in these fittings expanding and contracting more than other parts and, perhaps, finally rupturing. We are not aware that this has ever occurred in practice. Fittings in large variety are supplied by the company, including single and double junctions of different angles, bends, swan-necks, inverted junctions for anti-siphonage pipes, diminishing-pipes, &c. The pipes and fittings are made in diameters from 2 in. to 6 in., the lead-lining varying from 5 lbs. to 8 lbs. per square foot, and the cast-iron shell from ⅛ in. to ⅜ in. in thickness. The lead-lining of the spigot pipe is turned back outside the iron shell, so that the two surfaces of lead come in contact with each other in the lower part of the joint; the upper part of the joint is made tight by caulking with molten lead or with cold lead or brass caulking rings.

Messrs. George Price, Limited (Wolverhampton), send us an illustrated catalogue of their "Twentieth Century" bent steel safe with solid steel doors and patent automatic side-locking mechanism. The plan of the front of the door shows how the locking



Plan of Door of the "Twentieth Century" Safe.

mechanism is kept to the side so as to leave the whole door entirely lined with fireproof composition, not cut up by locks or bolts. They claim also that by removing the lock from the door and placing it in the frame of the safe, it is impossible to drill into it. The firm are introducing their safe in a somewhat cheaper form, known as the "Twentieth Century Special List" safe. Specimens of the safe can be seen in London at Messrs. Griffiths & Sons, 43, Cannon-street.

The Hathern Station Brick and Terra-cotta Company (Loughborough) send us a catalogue which is, as they describe it, really an instruction book for architects and engineers who may not be familiar with the working of terra-cotta. A true terra-cotta clay must, they observe, of its nature be liable to a large shrinkage, and they point out that the larger the blocks used the more time should be allowed to the manufacturer. Small blocks enhance the cost, but they give a better chance of a good result. Brief directions are given for measuring and taking quantities for terra-cotta, and as to the information required by the manufacturer; and an example of the manner in which the firm prepare a key elevation to a scale of 1 in. to the foot, with every block numbered for fixing. A good many photographs of buildings carried out in terra-cotta facing are given, some of them very good designs; but the company are rather deceived in thinking that architects are only "just beginning to realise" the advantages of terra-cotta, for the fact is that the feeling of the profession is beginning to go against the wholesale use of terra-cotta for carrying out a whole design of a building, though it was very popular for a time.

A pamphlet has been sent to us describing and illustrating the Bingham Patent Pavement as used in the streets of Sheffield. It is the invention of Colonel Bingham, and consists in the use of lines of granite setts alternating with rather narrower courses of wood, the Stringy Bark (*Eucalyptus obliqua*) of Tasmania being found to be the best for the purpose. The testimony in regard to its non-slippery quality seems very strong, but we can hardly believe that it can be, as stated by some witnesses, "as noiseless as a wood pavement." It is evidently, however, a form of street pavement worth attention.

Messrs. G. A. Fuller & Co. (New York) send us a pamphlet containing description and structural diagrams of Broadway Chambers, a high building erected by them from the designs of Mr. Gilbert Cass, architect, and illustrated by a model at the Paris Exhibition. Views of the model and of the actual building are also given. The pamphlet is a useful practical description and illustration of the method of construction employed.

The Worthington Pumping Engine Company (London and New York) send a pamphlet containing illustrations of their pumps as used at the Paris Exhibition. The entire water supply of the Exhibition was furnished by four Worthington triple-expansion high-duty pumping-engines located in the Worthington Pavilion, Quai d'Orsay. These engines have a capacity of 40,000,000 gallons per day, the water delivered being pumped to the basin of the Château d'Eau on the Champ de Mars, and after use in this fountain, passing by underground conduits to the Machinery Hall, where, after being used for condensation purposes, it is returned to the Seine. The illustrations are beautifully executed and of much interest.

The Edison and Swan Company, Limited, of Queen-street, London, send us a new illustrated catalogue of electric bells and accessories which they have just published. In addition to being a complete compendium of everything in connexion with electric bells, it gives lists of induction coils, automatic apparatus for lighting gas burners in inaccessible places, &c. We are glad to notice that the use of simplex steel tubes is recommended for wires which have to pass through plaster or between floors. These tubes would be a very effectual protection against damp or accidental injury, and would add very little to the total cost of the installation. The copper tape and wire rope they sell for lightning conductors are excellently adapted for the purpose, both from the theoretical and the practical point of view. The patent automatic speaking-tubes are a combination of a speaking-tube and a telephone system. At present it is necessary to have a special mouthpiece for every main tube; but in this new system one mouthpiece serves for any number of tubes. At the multiple switch-board, also, any electric telephone can be easily connected directly to the speaking-tube terminal, and so direct communication established. The wares of this company are all of English manufacture, and are well known in the trade for their high quality and finish.

Turr's Acetylene Gas Syndicate, Limited, of Westminster, sends us a catalogue of apparatus

for generating, purifying, and utilising acetylene. The syndicate makes a speciality of village and church lighting. Reference is made to the illumination of the church of St. Peter and St. Paul at Great Missenden as affording an example of the effectiveness of acetylene for church lighting. It is claimed that in the chancel, where the lights are concealed and reflected slightly downwards from a height, the illumination is particularly good. It is also claimed that acetylene is especially serviceable in dye works and other places where it is of importance that objects should appear of the same tint when the gas is in use as when the objects are viewed in daylight.

Correspondence.

To the Editor of THE BUILDER.

ARCHITECTURAL EDUCATION.

SIR,—Every one interested in architectural education will be glad to see Professor Simpson supporting so warmly, as he does in your last issue, the proposal to establish in London (as a preliminary to pupilage) a two years' day-course of architectural training such as that he has successfully established at Liverpool.

I am, however, surprised at his hesitation as to whether the Architectural Association is the proper body to undertake this work. If not, what body is? Is its labour of fifty years to be relinquished because it needs expansion?

I do not hesitate to say we must be first or last of the architectural teaching bodies of London. There is no middle course.

The question for every member of the Architectural Association to decide is whether the architectural profession is to set the standard of training, and to keep its educational system as much as possible under its own control. I can scarcely imagine that there will be two opinions as to the vital importance of doing both if we want to retain our *esprit de corps*, and to prevent art being subordinated to science in our schools.

The Architectural Association has clearly proved, in the face of much competition in evening teaching, that students of architecture prefer to be connected with a teaching body managed by architects for the benefit of architects only. This is what I mean by *a purely architectural college*, a phrase which Professor Simpson thinks a mistake. I am just as warmly in favour of a mixed art school for *junior* art students as is the Professor. The new National Art School at South Kensington will form such a school; but when a man has settled which branch of art he will pursue, then let him waste no time in selecting a training ground where that particular art is most thoroughly taught. As a school where a complete architectural curriculum is provided, leading up (without cramming) to the qualification for membership of the Royal Institute of British Architects, the Architectural Association must hold its own by the establishment of systematic day courses, and a crafts school attached.

If taken up with vigour and promptitude these day-courses (unlike its evening tuition) will have few competitors; nor need there be any doubt that directly its system and standard of training is up to the mark it will be recognised by, and affiliated to, the London University and very possibly subsidised by the Government.

If we all put our shoulders to the wheel, instead of hesitating to face a difficult but a proud task, we shall succeed.

My estimate of 1,000*l.* as the amount of the guarantee fund required to cover possible losses in establishing the two years' day courses is founded on data which may be taken as reliable. Professor Simpson has, I think, overlooked the fact that we have premises sufficient for a beginning, and that the deficit on the working would diminish each year as more students entered. According to his estimate of the number of students, we may anticipate the scheme would succeed beyond our dreams. W. HOWARD SETH-SMITH.

SIR,—Professor Simpson, in his letter of your issue of the 20th inst., advocates a preliminary training, extending over two years, for architectural students before entering an architect's office. He instances the training given at Liverpool, but writes as if no such facilities offered to London students.

Mr. Seth-Smith, also, in his Presidential address to the Architectural Association, briefly dismisses the architectural training at this college as "a department of what is really an engineering school." There seems to be, therefore, some misunderstanding amongst architects as to the position of architectural instruction held here, and I ask your permission to briefly explain it.

It is true that architecture is a department of the Faculty of Engineering, and that a matriculated student, whether in architecture or engineering, takes the same general course for the first two years; but his third year is exclusively devoted to architectural studies.

It is, moreover, open to any student not to enter for the full matriculated course, but to devote the whole of his time for one or two years, or for a longer period, to architectural studies exclusively, spending much of his time in the studio, but taking regular courses of lectures, as detailed in the syllabus, which it will be found are arranged so as to conveniently come within a two years' course; or he may attend for part of his time only, and select the special courses he desires to take up.

It is further open to such a student to include in his curriculum courses of lectures under any other professor in the college, while the fine collection of architectural casts and specimens of materials and models, and the architectural library provided by the Carpenters' Company and brought together by my predecessor, the late Professor Banister Fletcher, are open equally to all students of my department for the purposes of study.

I have no wish to seem to oppose Mr. Seth-Smith's scheme for day classes at the Architectural Association; on the contrary, I wish it all success, and believe that if it tends to promote the custom for architectural students to take a definite course of training before entering an office, this college, as well as the Architectural Association, will reap the benefit of an increased demand for systematic architectural education, and that there will be work for each to carry on in a not unfriendly rivalry. R. ELSEY SMITH.

King's College, London.

CARTHUSIAN HOUSES.

SIR,—I fear I cannot help your correspondent much, but the little I can I hope will be of use:—

Mount Grace.—There is a history and guide compiled by O. W. Smithson and printed by W. R. Smithson, Northallerton; this has a plan reproduced from the Yorkshire Archæological Society's plan. The Yorkshire Archæological Society's excursion to Mount Grace, September 16, 1896, has a good plan, also one of the small houses round the cloister.

London.—A good paper on the "London Charterhouse" was published in the *English Illustrated Magazine*; it shows a drawing of the building as Sutton left it, and a plan of a single house and several nice little sketches of different bits.

The English province contained nine houses, viz:—

Witham, Somerset	1181
Hinton	1227
Beauvale, Notts	1343
London	1371
Kingston-on-Hull	1378
St. Annes, near Coventry	1381
Epworth, near Lincoln	1376
Mount Grace, Yorkshire	1397
Shene, Surrey	1414

Scotland.—Perth, the only house: 1,429.

If your correspondent applies to Mr. W. H. St. John Hope (Society of Antiquaries), or to Mr. J. D. Micklethwaite (Dean's Yard, Westminster), who are the two best authorities on monastic plans, they are the most likely to be able to help him.

HENRY A. RYE.

THE STATISTICS OF SAXON CHURCHES.

SIR,—My attention has been directed to a contribution with the above title (one of a series) in your issue of October 13, in which the writer, Professor Baldwin Brown, refers to an opinion I have expressed respecting the age of the columns from the ruined church of Reculver, now preserved at Canterbury.* That opinion was that the columns in question were probably Saxon imitations of Roman work, and could not be assigned to the Roman period. To that opinion I adhere, and will, with your permission, give as shortly as possible the reasons on which it is founded.

Taking the three divisions which constitute a column and beginning with the base, it will be seen from Professor Baldwin Brown's illustrations (fig. 7) that the main features of the Reculver examples consist of what may be called two discs, the upper being the smaller, placed directly one upon the other. Both have the edges ornamented with corded beads. As a variation, in the lower disc of the second base a long key pattern of strange proportions is introduced between the corded beads. This ornament is not shown in the illustration. The arrangement here briefly indicated differs entirely from known Roman work. The attic base is the usual form to be found in this country, such a base for example as that from St. Pancras, Canterbury, given by Professor Baldwin Brown in his illustrations. Variations of this base may be observed occasionally, but these variations are mostly confined to difference of proportion in the mouldings, the arrangement of the two torus mouldings with a hollow between them being the constant feature. Professor Baldwin Brown himself acknowledges the unlikeness of the bases in question to the usual Roman type.

The next division, the shaft, again differs from Roman rules. Fragments of shafts of the Roman period are to be met with on various sites and in county museums. Almost invariably such fragments show a tapering from bottom to top. The shafts of the columns of the basilica of *Calleva* (Silchester) were thus formed, as were those of the great colonnade at Lincoln. The same was also the case in the columns of the large building found in Chester in 1863. The shafts of all these columns were of considerable dimensions. Smaller ones show diminution and occasionally an *entasis*, but this latter feature is of comparatively rare occurrence. Both the Reculver shafts are of the same diameter top and bottom. There is no diminishing. Professor Baldwin Brown assumes that the absence of *entasis* or of tapering in the shafts is immaterial, although these features are to be found in Roman examples all over the country, apparently basing this opinion on the fact that certain shafts in the churches of Lanchester and Chollerton, supposed to have been brought from Roman stations in their vicinity, have no such characteristics. These shafts, however, have marks of rehandling which may have effaced the comparatively slight tapering they originally had, or they may, indeed, not be Roman at all, for mediæval monolithic shafts are not unknown.

Another peculiarity of the Reculver columns must be mentioned. Like the usual form in mediæval work, they are built up of numerous drums. Were they Roman, one might expect to find them monoliths or built in sections of much greater length than they present.

The last and not least important of the three divisions is the capital. Here again there is the same difference from Roman work as has been remarked in the bases and shafts. The neck mouldings of both the Reculver capitals are distinctly non-Roman in character, whatever else they may be. The type of Roman necking in this country is a half round moulding with a hollow one beneath it, divided from it by a flat fillet.

In the Reculver examples we have a heavy half-round moulding between two beads. Above this necking comes a square block cut into three horizontal ridges, one over the other and largely rounded at the corners to fit it to the circular shaft. The three ridges may possibly be meant to represent the tiers of leafage in a Corinthian capital, but nothing resembling them is discoverable amongst the known Roman capitals in this country, nor anything so clumsy as this attempt to fit a square capital to a circular shaft.

These capitals have apparently lost their *abaci*, the addition of which would have given them a less uncouth look.

Professor Baldwin Brown repeats a suggestion made in Mr. C. Roach Smith's work ("The Antiquities of Richborough, Reculver, and Lymne," note to p. 198), that these capitals may have been adorned, or may have formed a ground work for enrichments in gilt bronze. If so, where are the signs of the fastenings of such metal work which would inevitably have been visible in the stone? It does not seem probable that such refined adornments were likely to be found in buildings of so remote a province of the Roman Empire as Britain, or that they would have been used at the late date the rude character of the columns implies.

In Professor Baldwin Brown's last paper, No. IV. (see *Builder*, October 20), an illustration is given on p. 337, fig. 12, of a capital of a column of the south door of the nave of Stopham Church, Sussex, of undoubted Saxon work. This capital shows on a small scale a considerable likeness to the Reculver examples, with the exception that it is less clumsily adapted to the shaft than in the larger and more celebrated ones.

Possibly Saxon bases of a similar form to those of the Reculver columns may yet be discovered.

GEORGE E. FOX.

SIR,—I notice that Professor Baldwin Brown claims a Saxon date for the church of Kingsbury, Middlesex. Will he kindly say upon what grounds this claim is based? I visited the church a few days ago and could not see any work of earlier date than the twelfth century, save some Roman flue tiles built into the walls.

I should like to ask, too, if it is safe to assume that the shafts at Lanchester and Chollerton must be Roman because they are monolithic. Are they not of the same date as the capitals and arches they support? Gundulf used monolithic shafts in the crypt at Rochester, and Ernulf in the crypt at Canterbury. The twelfth-century builders of Kirkstall Abbey used them in the dorter subvault, and they are to be found in later work at Fountains and Jervaulx.

Perhaps someone who knows the parish churches in the northern part of England can quote other examples. W. H. ST. JOHN HOPE.

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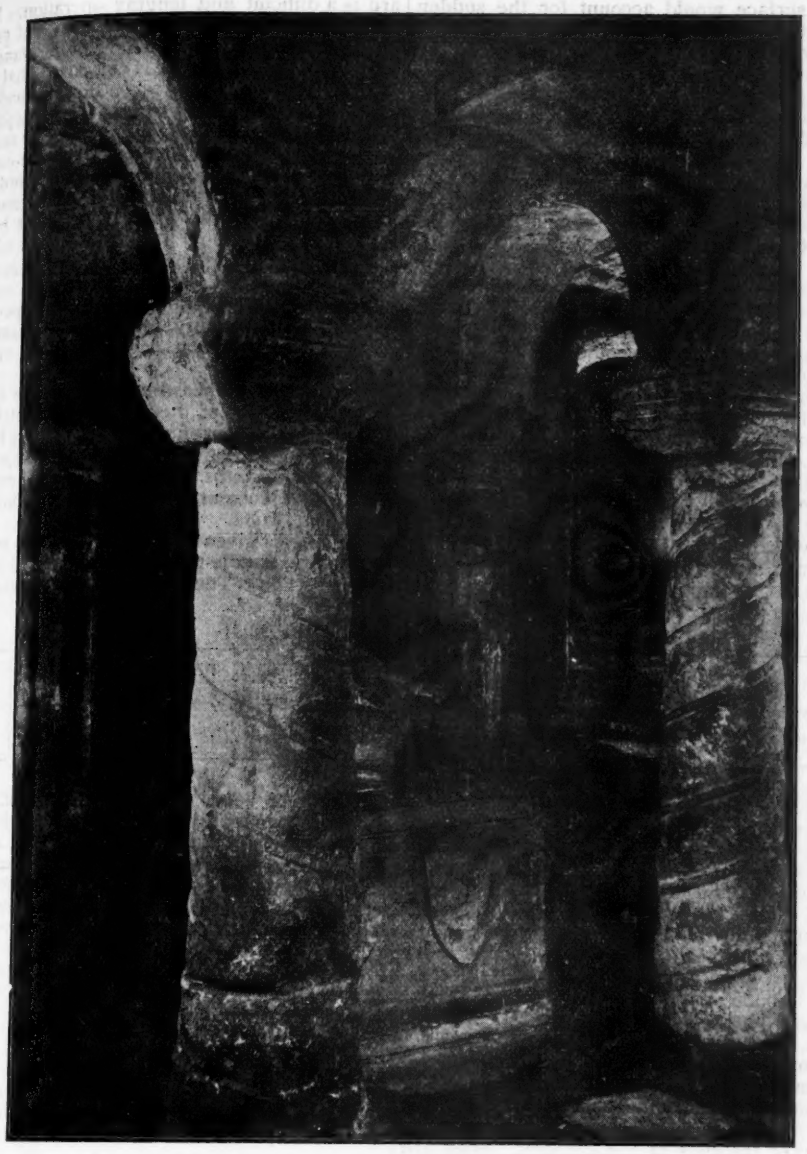
* In a paper in the *Archæological Journal*, liii, p. 355, entitled "The Roman Coast Fortresses of Kent."



Columns in the Crypt, Repton Church, Derbyshire.

Sir,—In the interesting paper on "The Statistics of Saxon Churches," by Professor Baldwin Brown, published in the *Builder* on October 13, a reference is made on p. 307 to the two columns at present in the porch of Repton Church, Derbyshire, which the writer says "*may* have stood originally in the opening between nave and transept. These are obviously like the crypt, late in the style."

This point has been dealt with fully in a book on Repton by the Rev. F. C. Hipkins, F.S.A., published last year.

On p. 24 is a plan showing the Saxon portion of the church, which had north and south transepts separated from the nave by two arches resting on a central column; and on p. 22 is a drawing made in 1847 showing these two Saxon arches as then existing. In 1854 came a "restoration," and that interesting feature was swept away, the columns and arches being replaced by pointed arches and sexagonal piers to match the rest of the nave, solely arising from a mistaken idea of uniformity. The two Saxon columns were, however, preserved, and placed in the church porch. These are built up of several circular drums, and, therefore, different to the columns in the crypt, which are monolithic, tapering, and spirally-wreathed, the space between each wreath having an outward swell.

I enclose a photograph of this crypt taken by Mr. W. B. Hawkins and myself.

Monolithic shafts might imply a survival of Roman influence, but there does not appear to be any proof of Roman occupation in the neighbourhood of Repton. C. B. Hutchinson.

CONCRETE BUILDINGS.

Sir,—I notice in your last week's "Notes" an interesting description of an eight-story concrete building, now being erected in Washington. From your remarks following the description, you are evidently unaware of the fact that to-day at least one building of almost similar construction is in existence in this country, and that another is in course of erection. The completed building I refer to is Messrs. Weaver's flour mill at Swansea, and the one in course of erection is a large seven-story warehouse on the quayside at Newcastle-on-Tyne, for which I am the architect.

Personally, I am of opinion that all building regulations should permit of reasonable latitude as regards thickness of walls and some other matters, whereby encouragement would be given to the introduction of concrete construction where found suitable, as, for instance, where difficulties arise in obtaining good foundations for buildings of brick or masonry. F. E. L. Harris, A.R.I.B.A.

Manchester.

RE COMPETITION AT NEWPORT.

Sir,—On March 3 last you inserted an advertisement inviting architects to submit designs in competition for a public library and technical institute at Newport, Isle of Wight.

I sent in my designs on April 30 last, and have been informed by the railway company that they were duly received, but from that day to this I have not heard one word from the Committee, although I have written to them on the subject.

Could you kindly make inquiries and find out if anything more is to be done in the matter, or if it is dropped, and whether any award will be made, and when?

I enclose my name and address.

A Competitor.

Board School, Queen's Park, Glasgow.—A secondary school is being built at Queen's Park, on ground adjoining the old Queen's Park school. The building will consist of two floors. On the ground floor there will be a manual workshop, a cooking department, a physical laboratory, a chemical laboratory, a lecture-room, cloakrooms, &c., and there will be a drill-hall measuring 74 ft. by 41 ft. Up stairs will be six classrooms, two art rooms, a sewing-room, and a gymnasium, measuring 41 ft. by 26 ft. The contractors include Mr. James Maben, joinery; Mr. H. Haddow, plumbing; and Mr. Wm. Forbes, plastering. The gasfitting will be done by Mr. John Hunter; Mr. James M'Grory will do the painting work; the glazier work will be executed by Messrs. Meikle & Sons; the steelwork by Messrs. P. & W. M'Lellan; and the smith work by Messrs. P. & R. Fleming. Messrs. H. & D. Barclay, of Glasgow, are the architects.

The Student's Column.

LESSONS IN ELECTRICAL ENGINEERING.

15. The Electric Arc—Carbon—Hissing—Rotation—Arc between Metal and Carbon—Candle-power of the Arc—Rectified Current.

THE electric arc was discovered by Sir Humphry Davy in 1800. He found that when two pieces of wood charcoal were connected to the terminals of a powerful voltaic battery, then touched together and separated, a kind of electric flame was kept up between them, and a dazzling light was emitted by the white hot ends of the pieces of charcoal. To utilise the electric arc for illuminating purposes has, however, taken several generations of physicists and inventors, and it is only within the last ten years that it has been adopted on any extensive scale. It is also rather extraordinary that, notwithstanding the many elaborate researches made on the electric arc, there are still many phenomena connected with it of which no satisfactory explanation has been given. Quite recently, however, some notable advances have been made by Mrs. Ayrton, and by the aid of the oscillograph many puzzling experimental results have been explained.

An electric arc can be maintained between pieces of various substances besides carbon, provided that the difference of pressure between the two pieces can be maintained sufficiently high. For example, if we have a pressure of twenty-five volts we can maintain an electric arc between two copper rods by feeding them together as the copper melts. Practically, however, carbon is the only substance used for arc lamps. The reasons of this are because carbon is a very poor conductor of heat as compared with metals, and hence the heat is localised at the ends of the rods and because it is very infusible, and hence a very high temperature is obtained. Again, carbon is easily disintegrated, and thus a long arc can be easily maintained. For these reasons it is very unlikely that any substance will be discovered superior to carbon for maintaining the arc.

Carbon is one of the chemical elements, and exists in three allotropic forms. The first of these is charcoal, and is obtained by the carbonisation of wood, paper, silk, and other organic substances. The second form is graphite, which is a well-known minera found in mines, and also in the hard carbon deposit in gas retorts. It is better known under the names of black lead or plumbago, and the form best known is that used in lead pencils. The third form is the diamond, which is a non-conductor of electricity. Both the first and third forms can be converted into graphite by subjecting them to very high temperatures. The carbons used for arc lamps are made out of powdered coke or gas carbon mixed with coal tar syrup or some similar carbonaceous substance. The paste is forced through a small round hole by hydraulic pressure, and the cylinder thus formed is cut into convenient lengths. These rods are then dried and baked at a dull red heat for several hours. They are classified as solid or cored. In cored carbons a narrow hole is drilled down the centre of the rod and filled up with a softer form of carbon. Great improvements have recently been introduced into the manufacture of carbons, owing to the great demand there is for the highest grade carbons, which are a necessity when enclosed arc lamps are used.

When a direct current arc is started between two carbons, it is found that after a little while the end of the positive carbon is hollowed out, formimg a little cup called the crater, and the end of the negative carbon is more or less pointed. A very little inspection shows that the end of the positive carbon is very much brighter than the end of the negative carbon. Of the light sent out at least 85 per cent. comes from the crater, about 10 per cent. from the negative carbon, and only about 5 per cent. from the arc itself. The positive carbon wears away about twice as fast as the negative carbon. If we project the image of the arc on a screen by means of a lens, then we can see that little bits of carbon get detached from one pole and immediately fly across to the other. There is a column of vapour between the two carbons at an exceedingly high temperature. The measure of this temperature is still un-

determined, but the most recent determinations indicate that it must be at least 6,000 deg. Fahr. At this temperature diamond is turned into graphite. After an arc lamp carbon has been used it is found that its end has been turned into graphitic carbon and it will mark paper just like a lead pencil.

Suppose now that we have an arc between two solid carbons, about a quarter of an inch apart, and suppose that they are in series with a battery of accumulators giving 100 volts and an adjustable resistance. Then, if the carbons are about 0·4 of an inch in diameter, the following phenomena are observed on varying the adjustable resistance. When we have a large resistance in circuit the current will be small—about three or four amperes ; but the voltage between the carbons will be high—about eighty volts. On diminishing the variable resistance the current in the circuit will increase, but the volts between the carbons will diminish. When the current rises to about twenty amperes the volts between the carbons will have fallen to about fifty-five. At this point a curious phenomenon happens—the arc gets into an unstable state and begins to hum. If the resistance be still further diminished the current will increase by a jump of about two or three amperes, and the pressure will suddenly diminish by about ten volts. The arc will now make a hissing noise, On diminishing the resistance still further the current will go on increasing, but the voltage across the arc will remain practically constant, the arc, however, always hissing.

If the carbons be close together and the arc be silent it is found that the difference of pressure between the positive carbon and the arc is about three-fourths of the total pressure between the carbons. Hence three-fourths of the resistance the current meets in getting from one carbon to the other lies between the positive carbon and the arc. Hence also three-fourths of the work done takes place at the surface of the crater, and this accounts for its high temperature. If now the current be increased until the arc hisses there will be a sudden drop of ten volts between the carbons, but of this drop seven volts takes place between the positive carbon and the arc, showing that there is a sudden lowering of resistance at the surface of the crater.

The following experimental results obtained by Mrs. Ayrton are very instructive. The table gives the pressure between the carbons and the pressure between the positive carbon and the arc with the largest silent current and with a hissing current of 25 amperes.

Length of Arc in Millimètres.	Largest Silent Current.		Hissing Current of 25 Amperes.	
	Pressure Between Carbons in Volts.	Pressure Between Positive Carbon and Arc in Volts (Calculated).	Pressure Between Carbons in Volts.	Pressure Between Positive Carbon and Arc in Volts.
1	42·2	32·1	32·1	24·4
2	44·5	32·2	34·6	25·2
3	47·5	32·3	37·0	25·7
4	49·4	32·4	40·5	25·7
5	53·0	32·5	43·9	27·9
6	55·0	32·6	45·9	27·2

These results prove that of the ten volts drop in pressure that takes place when the arc begins to hiss, about two-thirds is due to the lowering of the resistance on the surface of the crater, and the remaining third is due to a lowering of the resistance of the arc itself.

Mr. Trotter, in 1894, showed that when the arc was humming it was rotating with a velocity varying from 50 to 450 revolutions per second. He proved this by observing the arc through a disc having alternate arms and spaces and kept rotating rapidly. He found that when the revolutions were 450 per second the arc broke into a hiss. Now Mrs. Ayrton proved that hissing was caused by the crater becoming too large to occupy the end of the positive carbon and beginning to extend up the side. She also showed that if air were excluded from the arc, then there was no sudden drop of ten volts in the pressure, even when the current was three times as great as that which would cause hissing in air. Hence it seems exceedingly probable that hissing is caused by the air getting into contact with the crater. The oxygen in the air combining with the carbon on its surface would account for the sudden diminution in its resistance. Also the inrush of the surrounding air through a crack in the positive carbon leading to the crater would be sufficient to explain the rotation of the arc and the consequent hum just before hissing commenced.

One of the most interesting theories to explain what is going on in the arc is the electrolytic theory given by Dr. Fleming. In the electrolysis of liquids the molecule of the electrolyte is broken up into two ions which move in opposite directions with different velocities. Suppose, then, that something analogous to this is going on in the column of carbon vapour forming the arc. In this case the complex carbon molecule will be split up into positive and negative ions, and these will be moved rapidly in opposite directions. Dr. Fleming supposes that the negative ions move with such velocity, that by their impact the crater on the positive carbon is hollowed out, and that the positive ions move more slowly. The crater would always be covered with a cushion of these negative carbon ions, and this would create a resistance at this point which would account for the sudden drop in the electric pressure in getting from the crater to the arc. Again, owing to the affinity of carbon vapour for oxygen at high temperatures, it would follow that if air got access to the crater, then the negative ions would be destroyed by chemical combination, and the resistance at this point would therefore be diminished. An intermittent action would be set up, as diminishing the resistance would increase the current and so cause a greater rush of ions. The electrolytic hypothesis seems to explain all the observed phenomena.

We have hitherto considered the direct current arc, but an electric arc can also be maintained between two carbons connected to alternating current supply mains. In this case there is, of course, no difference between the shapes of the ends of the carbons. They are both moderately blunt. The arc is not continuous, but goes out twice during each complete alternation of the current. This phenomenon has been utilised to find out when the speed of an alternator is the same as the speed of the other alternators connected to the mains. If the flywheel of the alternator is illumined by an arc-lamp supplied from the mains, then when it has the required speed the flywheel appears either stationary or revolving slowly backwards according to the number of its spokes.

As an alternating current arc has a very variable resistance owing to the current through it always changing in magnitude, its power factor is not unity. If we use solid carbons, then it is difficult to maintain the arc, and its power factor is low, but the luminous efficiency is high. If we use cored carbons, the arc is very stable, and the power factor is nearly unity, but the luminous efficiency is not so high. Messrs. Duddell & Marchant have recently tried the effect of coring carbons with various substances, and have obtained extraordinary results. For example, with carbons cored with chromium oxide, a brilliant spluttering light was obtained, drops of molten metal being ejected. The arcs can also be coloured, and so ornamental illuminations can easily be made with these carbons. Again, on coring a carbon with a soda glass rod, it was found that only fifteen volts were required to maintain a one-millimetre fifteen-ampere arc. Hence six of these arcs could be used in series on a 100-volt circuit. Their luminous efficiency, however, was low.

An electric arc may be maintained for a short time between a metal and carbon electrode. In this case it is found that as a rule the current flows only in one direction. The current seems to flow much more easily from the metal to the carbon than in the reverse direction. The more rapid cooling of the metal assists the flow of current from it and hinders the flow towards it. If the metals did not melt so rapidly, this would give us a practical method of converting an alternating current into a unidirectional current.

Measuring the candle-power of the electric arc is a difficult and lengthy operation. It is difficult because the quality of the light given out is so different from the light of the standard glow-lamp with which it is compared, that it is almost impossible to tell when the two shadows of the photometer bar are of the same depth or when the two spots on the photometer screen are equally bright. Again, the candle-power in all directions must be measured and the mean taken if we wish to get an accurate measurement of the quantity of light being sent out. If we could surround the arc with a perfect diffusing globe which would appear equally bright in all directions and whose co-efficient of absorption was known, then we could greatly simplify the process of getting the "mean spherical candle-power" of an electric arc.

The following measurements may be taken as an indication of the manner in which an ordinary direct current arc sends out its light. The carbons were vertical, and were kept at a distance of 4 mms. apart during the experiment. The current was 9 amperes and the pressure 48 volts.

The angles given are the inclinations of the rays whose candle-power was measured to the lower carbon. The positive carbon was the upper one.

Angle in degrees	90	80	70	60	50	40	30	20	10
Candle-power	190	200	500	680	920	1,000	1,400	860	40

It will be seen, then, that horizontally the candle-power of this arc was 190, but that the candle-power of rays inclined 60 deg. to the horizontal was 1,400. If we measure the candle-power of rays sent up above the horizontal, we find that they are all less than 190, and diminish rapidly. Hence nearly all the light given out by the direct current arc is sent downwards. In practice the following empirical formula is often used to give the mean spherical candle-power of a direct current arc lamp :—

$$\text{Mean spherical candle-power} = \frac{H}{2} + \frac{M}{4}.$$

Where H is the horizontal candle-power and M the maximum candle-power. For example, the candle-power of the arc measured above would be given as $\frac{190}{2} + \frac{1,400}{4}$ *i.e.*, 445. This method of comparing arc lamps is not very scientific, but it is often used by makers in rough workshop tests.

It is sometimes assumed that the hollowing out of the end of the upper carbon is advantageous, as at first sight, seeing that we have a greater extent of white-hot surface, we might expect that more light would be thrown downwards. It can be proved, however, mathematically that the light sent out by a cavity is exactly the same as if the cavity were filled up and the end of the carbon were flat. Hence the light of maximum intensity proceeding from the crater goes vertically downwards and is intercepted by the negative carbon. It is owing to the negative carbon getting in the way that the light falls off so rapidly as we get underneath a vertical arc. For this reason there have been many attempts to make arc lamps in which the carbons are placed vertically side by side and the arc is kept at their ends by means of electro-magnetic repulsion from a coil excited from the mains.

With alternating current arcs as much light is thrown upwards as downwards, and hence alternating current arc lamps for street lighting are generally fitted with a large enamelled iron reflector which reflects back a considerable fraction of the light proceeding upwards. The relative advantages of alternating and direct current arc lamps must be carefully considered in practical work. With direct current arc lamps ordinary solid carbons can be used, but with alternating current we must use cored carbons. For the same power the light given out by the direct current arc is greater, and the dark space underneath the lamp is smaller than with alternating currents. Again, for the same power and pressure the alternating current is the larger, and hence there will be a larger ohmic loss in the mains. On the other hand, if we have an alternating current system of supply there will be the great advantage of having only one set of mains and much simpler arrangements than if we put down a direct current set specially for arc lamp lighting.

Mr. Ferranti's solution of the difficulty is to

use rectified current, that is direct current which pulsates in intensity. He gets this current from the alternating current supply by means of his rectifiers. This necessitates having a special set of mains for the arc lamps, but avoids the necessity of having separate plant. Ordinary direct current arc lamps are used, and the regulation of the rectifiers is good. If the rectifier be adjusted for 12 amperes, then with its full load of thirty lamps in series the current would be 11 amperes, and on short circuit only 14 amperes. The power factor of the primary circuit is, however, low, being only 0·6 at full load. These rectifiers are extensively used in this country. Another solution of this problem is to use an alternating current motor to drive a direct current dynamo, and much can be said in favour of this method.

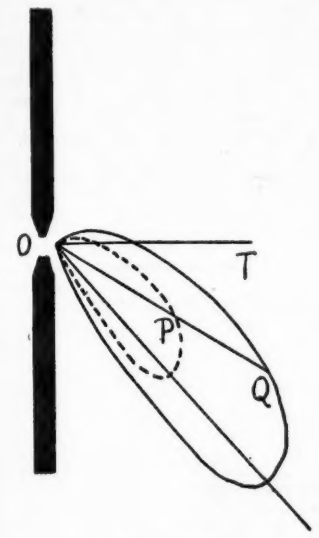


Fig. 1.

Figs. 1 and 2 illustrate the distribution of light coming from a continuous current and an

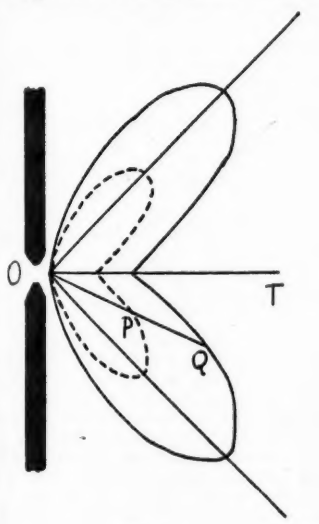


Fig. 2.

O Q = Candle-power of the violet rays.
O P = Candle-power of the red rays, which emerge in the direction O Q.

alternating current arc respectively. The full lines give the curve of candle power when two pieces of violet-coloured glass are inserted between the arc-lamp and the photometer screen and the standard lamp and the photometer screen. Hence these lines give the curve of candle power for the green rays. The dotted lines give the curve of candle power for the red rays, ruby glass being placed in front of the two lamps. It will be seen that the arc lamp sends out considerably more rays in proportion from the violet end of the spectrum than from the red end when compared with the relative proportions of the rays sent out by a glow lamp. The light sent out by the electric arc has a distinct violet tinge. When the arc hisses the light changes in character, the blue and green rays now being predominant, which shows that the temperature has been lowered. When the arc is surrounded by a good diffusing globe, these effects are not so conspicuous.

Several attempts have been made to produce a three-carbon arc-lamp for use on three-phase circuits. In the most successful lamp for this purpose the three carbons are placed vertically, the arcs being kept at their ends by means of electro-magnetic repulsion. Of course, each arc goes out twice in every complete period of the alternating current, but as there are forty or fifty periods in a second, it is quite impossible for the eye to see this, and the effect produced is that of three glowing points joined by a triangle of arcs. As everything is symmetrical, and the carbons consume at the same rate, it seems a promising method of converting electrical energy into light.

GENERAL BUILDING NEWS.

Reconstruction of Parish Church, Loftus-in-Cleveland.—On the 13th inst. the Marquis of Zetland laid the foundation-stone of the new chancel and other works connected with the parish church at Loftus-in-Cleveland. In the new designs the tower and the western gable remain as before, while the south wall will also stand, though its windows will be remodelled. The wall on the north side of the nave will be reduced in height, and will be the boundary for a side-aisle which will be formed by the erection of a series of stone pillars, carrying by means of five arches a clearstory wall, with seven small windows, to the same height as the south wall. The new chancel will be the same width as the nave, viz., 24 ft. interior and 29 ft. 9 in. exterior measurement, and will extend 33 ft. from the chancel steps to the eastern window, thus affording ample space for a surpliced choir as well as for the communion furniture. The roof of the nave and chancel will be continuous, the interior being open timbered (pitch pine) and the exterior covered by red tiles. On the north side of the chancel will be a transept, providing space for an organ chamber 15 ft. by 12 ft. 6 in., below which will be the heating chamber, the floor dividing the two being constructed of Messrs. Dorman, Long, & Co.'s steel joists filled in with concrete. Beyond this transept, and being designed in accordance with the north aisle, is a clergy vestry, having access to the chancel, and being entered from the churchyard by a Gothic door. The chancel floor will be elevated from that of the nave, and be approached by six steps. The south wall of the nave and chancel will be strengthened by four substantial buttresses. The pulpit will be of moulded freestone. The windows, twenty in number, will be of traceried design in stone, filled in with tinted glass. The whole of the stonework used in the new portion will, like the old, be obtained from the Marquis of Zetland's quarries. The eastern gable of the chancel will be surmounted by a small Maltese cross. The doors and other woodwork on the same level are of solid oak; and while the chancel will have a tesselated pavement, the nave will be laid with wood blocks embedded in concrete. The cost of the work is estimated at 2,700*l.* Messrs. Bastiman Bros., of Middlesbrough, are the building contractors, and they have sub-let the plumbing and glazing work to Mr. Harrison, of the same place. The architects are Messrs. Clark & Moscrop, of Darlington.

Presbyterian Church, Birkenhead.—This church, erected in the Tranmere district of Birkenhead, was recently opened. It is in the Gothic style of architecture, and includes also the ministers' vestry, and committee and cloak rooms. It is 90 ft. long and 60 ft. broad at the transepts. There is seating accommodation for 600 persons, the seats near the pulpit being arranged in a semi-circular form, which enables those of the congregation who occupy the side seats to hear and see the preacher without difficulty. The roof is lined with oak, and is a principal feature of the interior, while there are two rows of fluted pillars. The organ is placed in a recess at the back of the rostrum, while the keyboard is in front of the latter, inside the communion rails. The cost of the church will be about 5,000*l.* The edifice has been erected from designs by Mr. R. G. Sykes, architect, Liverpool. The lighting arrangements have been carried out by Messrs. Stott, of Oldham and Liverpool; the heating and ventilation (hot water and low pressure) by Mr. Hinson, of Birkenhead, and the ornamental ironwork outside by Mr. James Worrall.

Church, Grayshott, Hindhead, Hants.—The Church of St. Luke, at Grayshott, Hindhead, was consecrated on the 17th inst. The building, which is not yet completed, will accommodate 930 persons. Messrs. I'Anson & Son, of London, are the architects.

Congregational Church and Sunday School Building, West Hartlepool.—On the 17th inst. the foundation-stones were laid of a Congregational church and Sunday school building at the corner of York-road and Park-road, West Hartlepool. Mr. W. Lister Newcombe, of Newcastle, is the architect.

Restoration of Tredington Church, Worcestershire.—On the 19th inst. the Church of St. Gregory, Tredington, was re-opened, after restoration. The work carried out includes a new roof, a new east wall, and new flooring all over the church. The old pews have been put in order, and the glass in the windows has been restored. This work has cost about 3,000*l.* The architect for the restoration was Sir Arthur Blomfield. Messrs. Collins & Godfrey, of Tewkesbury, were the builders employed.

Church Schools, Almondsbury, Gloucestershire.—New schools in connexion with the Church of St. Mary the Virgin, Almondsbury, were opened on the 18th inst. The main schoolroom is 48 ft. by 32 ft., whilst the department for the infants measures 30 ft. by 18 ft. In addition, there are two classrooms, and cloakroom accommodation. Movable screens will give, when necessary, a hall about 60 ft. by 30 ft. Accommodation is provided for 211 scholars, the number in the old school being 166. The building is of red Cattybrook bricks, freestone dressings, roofed with Broseley tiles, and hot-water apparatus is employed for heating purposes. Mr. H. M. Bennett, of Bristol, is the architect, and the builders are Messrs. Adams & Jefferies, of Oldland Common. The cost was 1,375*l.*

Theatre, Woolwich.—The new Grand Theatre, which has been erected in Wellington-street, Woolwich, was opened by Sir Henry Irving on the 18th inst. The building is at the junction of Wellington-street and Lower Market-street, the main frontage being 80 ft. long. The building materials used were red brick with Bath stone pilasters and dressings. There is a central dome with iron corona. The main entrance to private boxes, stalls, and dress circle is by a low flight of steps from the street level. Through the entrance doors is the entrance hall with painted ceiling, walls decorated and panelled in fibrous plaster with ornamented Watteau panels, the floor being of marble mosaic. Passing through the entrance hall the foyer is reached, a semi-circular apartment with similar treatment to the entrance-hall. Corridors lead from hence to stalls and dress circle. There will be seating accommodation for 3,200. The auditorium has a clear width of 62 ft. and a depth of 75 ft. On the ground floor are the orchestra stalls, pit stalls, and pit, with heavy rake. Over this is the first tier, with four rows of dress circle and seven rows of balcony. There are six private boxes, three on each side of proscenium, all entered from their own staircase without entering the auditorium. Above the first tier is the gallery, with its fourteen rows of seating. The circles are constructed on the suspensory principle, with no column or obstruction to sight of any kind. The building is lighted throughout by electricity. The stage has a depth of 42 ft. by 80 ft. wide, with a height from stage to grid of 56 ft. There is a complete system of hydrants, and the stage is cut off when necessary by an automatic steel-framed asbestos curtain. The heating is on the low-pressure hot-water system. The building has been erected by Messrs. W. Johnson & Co., Limited, of Wandsworth Common. Mr. Bertie Crewe was the architect.

Sunday School Buildings, Lewes, Sussex.—The foundation-stone of a Congregational Sunday School building was laid at Lewes on the 17th inst. The site is near the Cliffe Bridge, and the building will accommodate 340 persons. Mr. E. J. Hamilton, of Brighton, is the architect, and Mr. E. Hammond, of Lewes, is the builder.

Observatory Tower, Oxford.—A tower for the accommodation of a new telescope is in course of construction at Oxford. The design of the tower is by Mr. T. G. Jackson, R.A. The building is 35 ft. in external diameter, and 53 ft. to the top of the dome. The engineer's work has been accomplished by Sir Howard Grubb, F.R.S., of Dublin.

Public Library, Limehouse.—The foundation-stone of a public library in Commercial-road, Limehouse, was laid on the 19th inst. The site is at the corner of Commercial-road and Norway-place, and there will be an open space in the rear, so that the reading-rooms, &c., can be lighted from three frontages. The frontage of the land to Commercial-road is about 55 ft., the depth from north to south being 138 ft. The accommodation on the ground story for the public will be a newsroom, 27 ft. by 38 ft., for seventy readers. This room will be lighted from Commercial-road and Norway-place. The room for the commissioner and chief librarian, 13 ft. by 18 ft., will also be provided adjoining the entrance from Commercial-road. The corridor leading to lending library and reference-room will be 7 ft. 6 in. wide, and the inner hall from which the newsroom and residence will be reached will be 12 ft. by 14 ft. The lending library will be in the centre of the building, entered from the main corridor, and will have counter space 30 ft. long, upon which indicators showing the numbers of the books which are in or out will be placed. The space for the public, 9 ft. by 21 ft., will be enclosed by framed and glazed partitions. The book shelves in the leading library will have a capacity of about 10,000 books, and further accommodation for about 6,000 books will be provided in the basement, where there will be rooms for assistants, binders, and also heating chamber. The lending library will be lighted by windows looking into Norway-place and by large lantern lights. The reference and magazine-room, 43 ft. by 19 ft., at the south end of the site, will be pleasantly lighted by windows looking south into a garden reserved for the purpose of securing such lighting. This room will accommodate from sixty to seventy readers. A room for the sub-librarian has been devised between the lending library and reference and magazine-room. The heating of the building will be by hot water at low pressure. The lighting will be by gas for some time to come, but the building will be forthwith wired

for electric lighting so as to avoid cutting away, &c., in the future when that light can be installed. Most of the architectural features will be executed in Portland stone, and the rest of the external work will be of yellow stone brickwork. Messrs. Sabey & Son, of St. Peter's-street, Islington, are the builders, and Messrs. F. & S. Flint Clarkson, of Bloomsbury and Poplar, the architects.

Public Baths, Birkenhead.—The new public baths at Birkenhead were opened on the 18th inst. The following description appeared in the *Liverpool Post*:—The site of the baths is on the south-easterly side of Livingstone-street, between St. Anne-street and Price-street, the main elevation being to Livingstone-street. Two entrances are provided—one for the first-class and ladies', and one for the second class. The first class swimming bath is 63 ft. by 24 ft., with dressing boxes along one side and one end. The second class swimming bath is 75 ft. by 30 ft., with dressing boxes along both sides, so arranged that the tops form a gallery, to be used for swimming galas, &c., and a large gallery is also constructed at one end of the bath. There are nineteen slipper baths—namely, twelve second-class gentlemen's, three ladies', and four gentlemen's first-class. A vapour bath and a needle and shower bath are provided in connexion with each of the classes of slipper baths. Salt and fresh water will be supplied to both slipper and swimming baths. In the whole of the building the various classes are accommodated with waiting-rooms, sanitary arrangements, &c. The building is constructed of brick, with red pressed brick and terra-cotta dressings. The contractor for the erection of the building was Mr. James Merritt, of Birkenhead. The contractors for the boilers, heating apparatus, and laundry machinery were Messrs. Thomas & Taylor, Limited, of Stockport, and Messrs. Newton, Chambers, & Co., Limited, of Sheffield, have carried out the contract for supplying and fixing the salt water storage tanks and filter. The cost of the building, including machinery, is about 11,000*l.*, and of the salt water storage tanks and filter about 1,600*l.* The baths were designed by and erected under the supervision of Mr. Charles Brownridge, A.M.Inst.C.E., Borough Engineer and Surveyor.

Weights and Measures Testing Station, Newcastle-on-Tyne.—The new station for the testing of weights and measures at Newcastle-on-Tyne was opened on the 19th inst. The building is situated in the City-road, and consists of two stories. The materials used were red brick and stone dressings. The architect was Mr. A. Sfockwell, Newcastle. Messrs. J. & W. Lowery, of Newcastle, were the contractors, and Messrs. J. C. Nicholson & Co., of the same town, supplied the machinery. A lift by Messrs. Waygood has been installed. The cost was 2,650*l.*

Vicarage, Clevedon, Somersetshire.—A new vicarage house at Clevedon was dedicated on the 18th inst. The house is built of local Pennant stone to the first floor, the rest of the building being of brick covered with hanging Broseley tiles. The dressings are of Box Ground stone, and the roofs are of Broseley tiles. The builder was Mr. W. A. Green, of Clevedon, the cost of erection having been 2,500*l.* Mr. F. W. Hunt, of London, was the architect.

Congregational Lecture Hall, Woking.—Memorial stones of this building were recently laid; the edifice will comprise a lecture hall to seat 250 people with kitchen and other offices. It is proposed to build, as soon as possible, a church in connexion therewith. The cost of the whole scheme is estimated at 6,000*l.* Mr. W. H. Seth-Smith is the architect.

Cottage Hospital, Burford, Oxon. — A cottage hospital is about to be erected at this place; the architects are Messrs. Waller & Son, of Gloucester, and the builder, Mr. A. Groves, of Milton-under-Wychwood.

Church Restoration, Sunningwell, Berks.—The ancient porch of this church is now being restored under the supervision of Mr. A. W. Poynter, architect; the builder is Mr. Alfred Groves, of Milton-under-Wychwood.

Restoration of St. James's Church, Bermondsey.—This church was reopened on the 15th inst. after undergoing a thorough restoration and renovation. Mr. A. H. R. Tenison was the architect.

Sunday School, Hepworth, Yorks.—School buildings erected in connexion with the Hepworth Wesleyan Chapel have been recently opened. The estimated cost is 1,600*l.* Mr. Joseph Smith, of Sheffield, was the architect.

Memorial Chapel, Sandford, Bristol. — The new Memorial Centenary Wesleyan Chapel erected at Sandford was recently opened. It stands on a site adjoining the old chapel, and is built of Rowberrow stone. The work has been carried out by Mr. Ford, Mr. J. Scourse, and Mr. J. Cole, of Cheddar; the architects were Messrs. Foster & Wood, of Bristol.

Golf Club-house, Dullatur, near Glasgow.—A club-house erected at Dullatur was recently opened by Mr. Alexander Wylie, M.P. It was built from plans prepared by Mr. John Robb, architect, of Glasgow.

Nurses' Home, Liverpool.—The new Central Home for District Nurses, at Liverpool, was opened on the 19th inst. The building is situated at the corner of Prince's-road and Parliament-street. Mr. J. Francis Doyle was the architect. The building contractor was Mr. Isaac Dilworth. Mr. S. R. Henshaw carried out the plumbing and decoration, and Messrs. J. R. Cooper & Sons the heating arrangements. Mr. G. Morris was the clerk of works.

Wesleyan Methodist Assembly Hall, Linthwaite, Yorkshire.—A Wesleyan Methodist assembly hall at Linthwaite was opened recently. Messrs. John Kirk & Sons, of Huddersfield and Dewsbury, were the architects, and the following were the contractors:—Masonry, Messrs. David Haigh & Sons, Golcar; joinery, Mr. William Schofield, Linthwaite; plastering, Mr. James Walker, Slaithwaite; plumbing, Messrs. George Garton & Son, Huddersfield; painting, Mr. Thomas Cartwright, Milnsbridge; slating, Messrs. Pickles Bros., Huddersfield; concrete and wood-block floors. Mr. Roger L. Lowe, Farnworth, near Bolton; heating, Messrs. Tomlinson & Milan, Limited, Huddersfield; furnishings, Messrs. Alfred Taylor & Hobson, Limited, Huddersfield; and mosaic pavement by Messrs. T. A. Heaps & Co., Huddersfield.

Church of the Holy Virgin, Churchill, Weston-super-Mare.—The new church, dedicated to the Holy Virgin, at Churchill, near Weston-super-Mare, was recently opened. The building is situated above Stock-lane on the right hand side of the Bridgwater-road, leading from Churchill to Langford, and is 2½ miles from Sandford G.W.R. Station and 12 miles from Bristol. The church and the residence of the curate-in-charge (which is situated in close proximity to the sacred edifice) were presented by Field-Marshal Sir Lintorn Simmons. The gift is intended as a memorial to Dame Blanche Simmons and to other members of Sir Lintorn's family. The site was presented by the same gentleman who also generously endowed the mission. The church consists of a nave to seat about 120 people, and a chancel in the form of an apse, built in a very free treatment of 13th Century style, and having on the south side of the chancel a recess and vestry. The main walls are constructed of Rowberrow stone from the neighbouring quarries, with Ham-hill stone dressings set in random range work. The external face of the walls are in rock work with dropped, crossed rubber work, whilst the internal facing is wrought in fine chiselled-dressed tooling. The roof of the nave is of open pitch pine, having carved ribs resting on stone corbels and is open at the apex. The roof of the chancel is of oak and is in the shape of a barrel vault, with red oak ribs. The east end of the church terminates in an apse of three sides. There are five lancet windows on the south side, three on the north side, six in the chancel and three much larger windows in the west wall, all being filled with plain cathedral glass in small leaded squares. The floor of the chancel is laid with glazed Staffordshire tiles in pattern, and wood blocks form the floor of the nave. The choir stalls are of carved oak. The lighting is by means of brackets of hammered iron-work of antique pattern, which burn acetylene gas generated in a small detached building on the south side of the church. Heating is accomplished by small-bore pipes. The roof is covered externally with strawberry coloured Broseley tiles, and at the apex at the west end is a turret, in which a bell is placed. The north porch is of open-timber work, oak; the roof consists of oak tiles, and the floor is laid with slates, set on edge, in squares. In the west wall, on the outside, a few feet from the ground, is inserted a large polished granite tablet, on which is a suitable inscription. The principal entrance to the church is through a porch, with a framework of oak which is covered with oak shingles, and has a flooring of tiles set on edge. There is an oak screen between the chancel and the vestry, and at the west end is placed a font of Ham Hill stone. The house of the curate-in-charge, which is near, is constructed of similar material. There are two floors and an attic. On the ground floor is the entrance-hall, from which open three rooms, and in which is a cut-off door leading to a spacious kitchen and servants' quarters. A broad staircase leads to a landing, from which there is access to several bedrooms and bathroom and offices, and, through a cut-off door, to the servants' apartments. There is also a second staircase for the use of domestics. There are two rooms in the attic. Angular tiles from Bridgwater cover the roof, and the gables are faced with vertical Broseley tiles. The architects are Messrs. Samson & Cottam, of Taunton and Bridgwater.

Union Chapel, Lynn.—The ceremony of laying the foundation-stones of this building recently took place. The site of the building is the old toll-bar premises, and at the rear a schoolroom has already been erected. The style of the new building will be Early English. It will be built of red brick, relieved with white Costessy ware dressings. The extreme dimensions will be 60 ft. by 40 ft., and there will be seating room for 320 persons, exclusive of the accommodation in the choir gallery. The architect is Mr. J. L. Carnell, of Lynn, and Mr. W. F Smith is the builder. The cost of the chapel is estimated at 1,470*l.*

Baptist Church, Chalk Hill, Bushey.—The Bushey and South Watford Baptist Church, Chalk Hill, has recently been reopened, after having been closed for some time for the purposes of redecoration, and for making some additions and improvements. The additions consist of a new eastern porch, entrance-hall, lavatory, &c. The architect is Mr. W. H. Syme.

Mission Hall, Aberdeen.—The mission hall in Correction Wynd, in connexion with the West Free Church, was reopened on the 19th inst., after extensive alterations and improvements. The architect was Mr. G. Bennett Mitchell (of Messrs. Davidson & Garden). The contractors were—masonry, Messrs. Eddie, Findlay & Henderson; carpentry, Messrs. Watson & Robb; plumber, Mr. A. B. Robertson; slater, Mr. George Davidson; plasterers, Messrs. J. Bannochie & Son; heating, Messrs. Tindall; ventilation, Messrs. D. Macandrew & Co.; painters, Messrs. Garvie & Sons.

Improvements, Old Aberdeen Reading-room. —The extension and improvements at the Old Aberdeen Branch Reading-room have now been completed, and the reading-room was open on the 20th inst. Formerly the reading-room wus somewhat small, and in rather bad repair. The Public Library Committee have now, however, had a brick wall removed, and an adjoining room taken in, so that the reading-room now runs along the whole of the building on the first floor. The interior of the room has been entirely redecorated. Improved lighting facilities have been provided, with the necessary additional furnishings. The alterations have been carried out under the supervision of Mr. John Rust, City Architect. The contract for the alteration was in the hands of Mr. John Williamson, Huntly-street.—*Aberdeen Free Press.*

SANITARY AND ENGINEERING NEWS.

Water Supply, Weardale and Shildon District, Durham.—In consequence of the constantly growing demand for water in the district supplied by the Weardale and Shildon District Water Company, the directors have deemed it expedient to take the preliminary steps towards the construction of a large impounding reservoir in Upper Weardale. With a view to obtaining extended Parliamentary powers for this purpose, a series of comprehensive surveys is being made by the staff of Mr. Hawkesley, C.E., consulting engineer to the company, and a private Bill seeking the necessary powers will probably be lodged next month, in time to be dealt with in the ensuing session of Parliament.—*Leeds Mercury.*

Water Supply, Prestatyn.—The Urban District Council of Prestatyn have decided to proceed for Parliamentary powers to acquire, by compulsion or otherwise, certain waterworks in the district. Mr. Charles H. Beloe, of Messrs. Beloe & Priest, engineers, Liverpool, has been appointed engineer to prepare plans and give evidence before the Parliamentary Committee. The waterworks were established some few years ago at a cost of over 3,000*l.*, but during the past two years the supply has become inadequate, as Prestatyn has almost doubled its population.

Drainage Works, Earls Colne, Essex.—Messrs. Taylor, Son, & Santo Crimp, engineers, of Westminster, have prepared a scheme for the drainage of the parish of Earls Colne. The estimated cost, omitting some portion of the scheme, is 7,000*l.*

Edinburgh and District Water Supply.—This work is making rapid progress. The Water Trustees visited the site in the Talla Valley the other day on an official visit of inspection. According to a report in the *Scotsman*, the party was conducted over the new works by Mr. Tait, the engineer, who explained the principle of the construction of the puddle trench, how the great embankment supporting it would be raised, its breadth being 650 ft. at the base, and tapering to 20 ft. at the top, the capacity of the reservoir (2,700,000,000 gallons), and the amount of water that could be drawn for the town supply, and what would require to be given off for compensation. With the wet weather which has recently prevailed, the Talla and all its tributaries were in flood. The main stream, despite its size, was found running remarkably clear, and it was stated, after an examination of the gauge, that the flow of water in it on one occasion was equal to about 45,000,000 gallons in twenty-four hours. It was by such floods, Mr. Tait said, occurring frequently during the winter season, that they expected speedily to fill the reservoir when it was finished. Not a great deal of work has been accomplished in connexion with the construction of the reservoir since the middle of 1899. This was owing last year to the stoppage of the original contractors, and this year to the difficulty experienced by the new contractor, Mr. Best, in getting labour on account of the war and other causes. A very important addition, however, to the contractor's plant, by which, it is hoped, great progress will be made with the construction of the puddle trench, was very noticeable in an aërial wire-rope railway, which has been carried right across the valley, and is 1,500 ft. in length. It is driven by means of steam power and a drum set high up on the east side of the valley. It will be used to deposit the clay in the trench over which it is suspended. The clay is brought by rail from Carluke, and unloaded at a spot near to the engine-house of the aërial railway. There it is "soured," and thereafter filled into a large hopper capable

of carrying three or four tons. This hopper is suspended in mid-air from the ropes, and travels very much the same way as a cable-car does. It can be lowered from the engine-house at any point, and the clay shot from the hopper at the place where it is wanted. The new house, which has been erected on a terrace on the east hillside of the valley, and has cost about 1,600*l.* It is a substantial structure of rubble, faced with red sandstone, and has stepped gables and large bay windows. The part of it which will be used by the trustees on their periodic visitations includes on the ground level a large dining-hall, 42 ft. by 20 ft., with the walls and ceiling tastefully panelled in pitch pine; a spacious entrance hall, treated in the same fashion; and suitable kitchen, lavatory, and cloakroom accommodation; while upstairs are a smoking-room and several bedrooms. To the rear is the house of the superintendent of the reservoir and a yard, with coachhouse, stable, byre, &c. Several of the officials engaged in the Talla contracts were present, including Messrs. Best and Messrs. Thomas & William M'Alpine, of Messrs. R. M'Alpine & Sons, Glasgow.

MIDLAND RAILWAY EXTENSIONS AT BINGLEY.—The work of doubling the Midland Railway between Bingley and Thwaites has now been completed. Some time ago the bridges on the route were tested, four of the heaviest types of engine being run across them simultaneously, and it has been evident during the last few weeks that the finishing touches were being put on. On Sunday a large gang of men commenced the work of making the junctions at the Bingley north box—where the widening commences—at Marley and at Thwaites, and then the running of the trains commenced. The work of extension has taken about eighteen months, having been commenced in the early part of 1899. The total length of the extension is two and a quarter miles, and the works have been carried out by Mr. W. Mousley, the contractor who constructed the Midland extension between Skipton and Ilkley. From the north signal box at Bingley the extra accommodation has been gained by putting down a line on each side of the previous main road, but after passing through the bridge at Crossflats which carries the Keighley and Bradford road over the railway the extra lines have been laid on the western side only up to Thwaites, where the extension terminates. The principal works which have had to be dealt with in the course of the extension have been the widening of the bridge at Crossflats and the spanning of the river Aire with another bridge at Marley. At Crossflats the extra lines have been provided for by adding an arch to each side of the existing bridge, whilst at Marley a new bridge had been erected to carry the new lines at a distance of some 50 ft. from the other and older bridge. The new bridge is carried across the stream by four steel columns, which have each been sunk into the river bed to a depth of more than 80 ft. The side girders are in three sections, and are supported at the banks by heavy masonry, and over the river, of course, by the columns named. Messrs. A. Handysides & Company, Limited, of Derby, have been the sub-contractors for the steel and iron work required for the bridges. The extension has been carried out from plans prepared by the company's chief engineer, Mr. J. Allen McDonald, M.Inst.C.E., and the works during progress have been under the superintendence of Mr. Cecil E. Hawley, Assoc. M.Inst.C.E.—*Bradford Observer.*

ELECTRIC LIGHTING NEWS.

ELECTRIC LIGHTING, HORNSEY.—Colonel Luard, R.E., recently held an inquiry at the Hornsey District Council offices into the application of the Hornsey District Council to the Local Government Board, for sanction to borrow 73,500*l.* for the purpose of making an installation of the electric light in Hornsey. Mr. Robert Hammond, Consulting Electrical Engineer to the Council, explained that the cost of the undertaking would be as follows:—Generating works, 28,110*l.*; feeders and distributors, 31,003*l.*; public lighting, 4,700*l.*; meters, house connexions, &c., 4,575*l.*; and general charges, 5,112*l.*; a total of 73,500*l.*

ELECTRICITY WORKS, AND REFUSE DESTRUCTOR, HACKNEY.—On the 18th inst. the foundation-stone was laid of the electricity works and refuse destructor, which are being constructed by the Hackney Local Authorities at a cost of about 250,000*l.* Nearly the whole of this amount is to be expended on providing a system of electric supply for the district. The buildings will stand upon a site five acres in extent in Millfields-road, adjacent to Lea Bridge. The electric supply will involve the laying down of many miles of cables, and the residents in fifty miles of streets will be provided for. The public lighting of sixteen miles of thoroughfare will also be effected, with arc lights. Mr. Robert Hammond is the engineer.

H.A.C. ELECTRIC LIGHTING.—The headquarters of the Honourable Artillery Company are being wired for the electric light, and everything will be ready for the reception of the C.I.V. on Saturday. Some special fittings have been designed for the rooms in this well-known building, and the arms of the H.A.C. are being worked in them. The contract is carried out by Messrs. Donnison, Berlyn, Sillem, & Co., of London and Liverpool.

FOREIGN.

FRANCE.—The monument to Chopin has been set up in its place in the Luxemburg Garden. It is the design of M. Dubois (sculptor) and M. Eugène Petit (architect), and consists of a portrait bust on a narrow stele, decorated with a female figure in relief. The whole stands on a granite base.——A large group of school buildings has just been completed at Bagneux, near Paris.——M. Redon, the architect, is occupied in the works for fitting up the Pavillon Marsan at the Louvre for the Musée des Arts Decoratifs. The work will be completed and the collection arranged in January.——The Bishop of Saint-Brieue has founded in his diocese a committee of Breton archæologists, which is to be consulted in all questions concerning the restoration, alteration, or rebuilding of ecclesiastical edifices in the diocese.——The Municipality of Avignon are continuing their work of destruction of the ancient city, and have now, under the pretence of consideration of public health, demolished a fresh portion of the ramparts, the Porte de l'Oulle leading to the bridge of Avignon. The Commission des Monuments Historiques appears to be powerless to arrest these operations.——The Government has presented to the Municipality of Paris the fountain in ceramic ware which was erected in the Champs Elysées in connexion with the great Exhibition, and which was made at the national manufactory at Sèvres.——The Government propose to annex to the city of Paris all the suburban Communes comprised between the Seine and the portion of the fortifications which it has been decided to suppress. The names of these Communes are Soulogne, Bellamont, Neuilly, Le Vallois-Perret, Clichy, and Saint Ouen.

GERMANY.—It is proposed to erect a large synagogue in Düsseldorf, and sketches are invited by Mr. J. Levison of that city. The competition is open to all architects, and the drawings have to be sent in by December 17 next. The premiums offered are 3,500, 2,000, and 1,200 marks respectively, for the designs selected first, second, and third in order of merit.——The city authorities of Dresden having determined to erect a new town hall, or municipal buildings, have invited designs from German architects; the author of the first premiated design will receive 10,000 marks, and those designs adjudged second and third will be allotted correspondingly lower premiums. The date fixed for sending in the drawings is February 15 next.

AUSTRIA-HUNGARY.—The town authorities of Zara are about to erect a large educational institution for girls, the work to be commenced in December next.——The Municipality of Prague have decided to improve both the old and part of the new city by providing better means of communication where desirable and economically feasible.——German-Austrian architects are invited by the Municipal Authorities of Baden to send in competition designs for a large bathing establishment together with a hotel. The prizes offered are 3,000, 2,000 and 1,500 kronen respectively for the first, second, and third premiated designs. Drawings have to be sent in by January 7 next.

UNITED STATES.—The completion of the rapid-transit tunnel in New York is likely to be followed by the construction of many private tunnels, connecting the underground stations with office buildings, hotels, &c. It is believed that where the buildings to be served are near a station, the construction of such private tunnels will prove to be a profitable undertaking.——The Wachusett dam about to be constructed for the Metropolitan Water Board in Boston will be one of the largest of its kind. Though not very long (about 1,400 ft.) the height in the middle will be 200 ft. above the rock foundation; the masonry at the foot of the dam will be 175 ft. in thickness, whilst at the top it will be 23 ft. It is to be built of rubble masonry, faced with coarse ashlar.——The price of building materials in the United States has become materially reduced during the past few weeks.

INDIA.—The heavy rain which has of late fallen on the Ghats have caused serious landslips; a particularly bad slip has occurred on the Bhore Ghat, destroying much of the line of the Great Indian Peninsula Railway near that locality.——The large railway station buildings at Secunderabad are nearly completed.——The extensive alterations which have been in progress during the past eighteen months, to buildings and bridges in Lahore station yard, are expected to be completed before the end of the current official year.——It has been decided to build some large suspension bridges at certain points along the Srinagar-Leh road (Central Asian trade route), and one of them, to be known as the Kargil bridge, has been already taken in hand.——Mr. John Adam, architectural engineer and surveyor to the government of Bombay, has recently retired from that post.——The Governor-General has sanctioned the survey for a proposed line of railway from Pegu station, on the Burma railways, to Moulmein, a distance of 114 miles; the work has been placed under the control of the government of Burma.——The city of Guntur is to be provided with new waterworks, the supply being taken either from springs in the neighbourhood, or from the Kistna canal.

MISCELLANEOUS.

BRITISH FIRE PREVENTION COMMITTEE.—The Executive of the British Fire Prevention Committee have decided to postpone the opening of their new testing station until after Christmas, as their testing operations are principally carried on in the spring and summer months, and many of the firms who wish to have tests undertaken prefer to avoid the winter weather for research work of this description. During the first part of the current session the Executive of the Committee will hence be mainly occupied in dealing with tests already undertaken in the summer, but in respect to which reports have not yet been issued. They will also be preparing an analysis of the tests undertaken to date, for which there appears to be considerable request. The offices of the Committee at Waterloo-place will again be available during the winter months as a reading-room, and a file of over sixty technical journals from different parts of the world has been arranged for, whilst a small collection has also been formed in the reading-room with a view to showing materials that have been subjected to tests.

THE HOUSING OF THE WORKING CLASSES.—The London County Council have lately had under their consideration and have passed some schemes, with plans prepared by their Housing of the Working Classes Committee, for the erection of artisans' dwelling-houses, in blocks, upon the east side of London Fields, Hackney, the site of Reid's brewery, Clerkenwell-road (which has now been cleared); the south-west side of Drury-lane, near Crown and Martlett courts; and Portpool-lane, Gray's Inn-road. The Council have also signified their approval of the plans submitted to them by the Engineer's Office of and on behalf of the London and South-Western Railway in respect of five blocks of similar dwellings on the Boniface-street and Upper Marsh, Lambeth, site.

THROGMORTON-STREET.—The new restaurant and offices will shortly be opened to the public. The premises have been erected after Mr. Charles Reilly's plans and designs by Messrs. Colls & Sons, whose tender for the first portion of the structure amounted to 38,696*l.* The site, in Throgmorton-street, and Throgmorton-avenue, was leased by the Drapers Company to Messrs. J. Lyons & Co.; for the new buildings was pulled down the screen-front—one bay excepted—designed for Drapers Hall by Herbert Williams, who in 1865-70 reconstructed the Hall, with its inner quadrangle, ladies' parlour, court, and livery-rooms, and principal staircase. The remaining bay of the screen-front is converted into a state entrance into the hall, besides the new chief entrance and the staircase on the Throgmorton-avenue side as part of the alterations recently carried out for the Drapers Company under the superintendence of Mr. T. G. Jackson, R.A. After a fire in 1774, Robert Adam repaired the interior of the hall and reinstated the main front; the Company's Hall had been rebuilt from designs ascribed to Edward Jerman, who died in the autumn of 1668, and it is believed that Cartwright, the mason, completed the work.

PULPIT, ST. NICHOLAS CHURCH, TUXFORD.—A votive offering, consisting of a sculptured pulpit chiefly made of marble and alabaster, has recently been placed in this church. It is designed in the Perpendicular or fifteenth-century style of Gothic, and stands upon a massive shaft of polished Devonshire marble. Each cant in the body of the pulpit has a recessed panel, with an ogee head of carved tracery work, into which is introduced much delicately carved foliage of a conventional type. In the central panel is a representation of the crucified Christ, carved in the round in pure white Castellina marble, whilst on the north side is a statue of St. Agnes, and on the south one of St. Anne, both in the same material. These figures are accentuated by the dark-coloured polished marble against which they stand. The top cornice is of veined and polished alabaster, and at each angle are carved figures of angels. A suitable inscription has been cut into the plinth. The work has been carried out in its entirety by Messrs. Harry Hems & Sons, of Exeter.

PUBLIC IMPROVEMENTS, ECCLES.—On the 18th inst., at Eccles Town Hall, Col. J. T. Marsh, R.E., held a Local Government Board inquiry into an application by the Corporation of Eccles for permission to borrow 5,308*l.* for electric lighting purposes, and 2,185*l.* for private street improvements. Evidence was given by the Surveyor, Mr. Pickton.

ADDITIONS TO WORKHOUSE, BELFAST.—On the 18th inst. a Local Government Board inquiry was held at Belfast, relative to the application of the Board of Guardians to borrow 13,500*l.* for building new boardrooms and clerks' offices at the workhouse.

FIRE TESTS WITH "MACK" SLABS.—No. 52 of the publications of the British Fire Prevention Committee contains the records of a test of a partition formed with "Mack" patent slabs, erected by Messrs. J. A. King & Co. The partition was composed of slabs, each 10 in. in height and 2¾ in. thick, and of lengths varying from 1 ft. 6 in. to 4 ft. 10½ in. The slabs, according to the maker, were made of plaster, with cocoanut fibre, cork dust, and reeds embedded therein and running horizontally along their whole length. There were from thirty to forty reeds in each slab.

The slabs were delivered at the testing station with square ends. The ends were afterwards sawn out to form the vertical V joints. The slabs were set with mortar mixed in the proportion of 2 parts of plaster of Paris, 1 part of lime, and 2 parts of sand The vertical joints were grouted in with the same material. The inside face of each slab was keyed for plaster. The inside of the partition was plastered one coat of coarse stuff, composed of plaster of Paris and sand in equal proportions, and with a finishing coat of plaster, sand, and lime in the proportion of 1 part of plaster of Paris, 2 parts of sand, and 1 part of lime. The outside of the partition was plastered one coat with lime, putty, and plaster of Paris in equal proportions, mixed with water, to which a small proportion of sugar was added. The result of the test was as follows:—The gas fire was lighted at 3.30 p.m. At 3.32 p.m. the setting coat of plaster on the fire side of partition commenced to blow off; at 3.34 p.m. the setting coat had all blown off; at 3.35 p.m. fine hair cracks, following the horizontal joints of the slabs, began to appear on the passage side of partition; at 3.41 p.m. steam began to issue at various points from these joints; at 3.44 p.m. fine hair cracks following the vertical joints of slabs began to appear on the passage side of partition; at 4.11 p.m. the fine hair cracks in the vertical joints almost closed up; at 4.15 p.m. the setting coat of plaster on the passage side of partition showed two blisters about the centre, one at the level of the fifth joint and the other at the level of the seventh joint; at 4.45 p.m. the gas was turned off. The fire had not passed through the partition, and the surface on the passage side, except for the hair-cracks and two blisters before mentioned, was unaffected by the fire.

Refuse Destructor, Ramsgate.—The large refuse destructor erected at Ramsgate has recently been put into operation. According to *Pullen's Kent Argus*, the installation for the consumption of rubbish consists of four cells, each having a grate area of 30 square feet, with a drying hearth at the back of each cell. They are of the Horsfall patent type, fed from the back, and arranged in one block, side by side. Each cell is guaranteed to consume ten tons of refuse in every twenty-four hours. Forced draught from the boilers is provided to each of the cells from a suitable blast fire, so arranged as to work either independently or in conjunction. The induced current of air serves to ventilate the feeding floor and consume any gases given off by the refuse deposited thereon. The only opening for the escape of the products of combustion is in the front of each furnace over the clinkering door, so that all the fumes given off by the green refuse in drying have to pass forward and over the hottest part of the fire before they can escape to the chimney, and are thus cremated within the furnace itself. The boilers are of the Babcock and Wilcox water-tube type of the best make. Each boiler has a heating surface of 870 square feet, suitable for a working pressure of 120 lbs. per square inch, and provided with all the necessary safety valves, steam gauges with automatic closing valves, check valves, &c. The feed pump is a Worthington regular pattern, with steam cylinders 4½ in. diameter, brass lined, with 4 in. stroke. The patent centrifugal dust-catcher is constructed of Stourbridge fire-bricks, faced on the outside with High Broome facing-bricks. It is strengthened by three 12 in. by 2 in. wrought iron rings, each made in four pieces, and bolted to iron vertical stays. Five cleaning doors are provided, four giving access to the external chambers, and the fifth through a tunnel to the central wall. An overhead railway of Cox & McTaggart's patent system will be provided for the removal of clinker. The railway will form a circuit, passing along the furnace fronts into the clinker-crushing house out on to the crushing-floor and back into the destructor house. It will carry two strong steel buckets of a capacity of 60 cubic feet each, and hung on trunnions, so as to be readily tipped. A clinker-crushing mill of Cox & McTaggart's patent system is fixed in the crushing-house below the floor level, and fed by a hopper delivering the clinkers between two interchanging cast-iron fluted rollers of 20 in. diameter and 21 in. long. The crushed clinker is then raised automatically by a patent elevator into a revolving screen. A heavy overgeared mortar-mill with revolving cast-iron pan, 8 ft. diameter, is provided. The engine for driving the whole of the machinery is of the horizontal right-hand type, and made by Messrs. Ransome, Sims, & Jeffries, of Ipswich. The buildings throughout are lighted by electricity, generated by a dynamo supplied by Messrs. Ernest Scott & Mountaine. The chimney is 102 ft. 8 in. high from ground level to top of cap; it is constructed in outer and inner shells, the outer being of octagonal shape on plan, and standing on square base with plinth, quoins, cornice, neck moulds of Portland stone, the cap being of heavy cast-iron construction. The offices for manager and workmen are fitted with pitch-pine furniture, and there are a men's messroom and bathroom. The chief contractors for the whole of the works have been the Horsfall Destructor Company, Limited, Leeds; the sub-contractors being Messrs. Hayward & Paramor, of Dover and Shorncliffe, for buildings; Mr. G. Tourney for the chimney shaft; Messrs. Stephenson for clinker and mortar mills; Messrs. A. & J. Main for ironwork of roof and girders; Messrs. Ernest Scott & Mountaine for dynamos and lamps; Messrs. Christian & Phipps for general electric lighting; and Messrs. Ransome, Sims, & Jefferies for the engines. Mr. T. G. Taylor is the Borough Surveyor.

Property Sales.—(1) The lease of Lees or Leighs Priory, near Felsted, in Essex, founded in or about 1230 by Sir Ralph Gernon for Augustine canons and friars, and dedicated to the Virgin and St. John the Baptist. The priory, once famous for the extent and magnificence of its buildings, is now represented by a lodge (since a farmhouse) and the late fifteenth-century gatehouse, a handsome massive building of red brick with stone mouldings and tracery, and having corner turrets, octagonal on plan, panelled, and embattled. At the Suppression, the priory, valued by Speed at 141*l.* 14*s.* 8*d.*, was bestowed upon Sir Richard Rich, Chancellor of the Court of Augmentations, who altered and enlarged the premises, building two quadrangles, and made extensive additions to the park. Rich, who founded the school and almshouses at Felsted, was elevated Baron Rich of Leez in 1547; his grandson was advanced Earl of Warwick in 1617. William, second Duke of Manchester, sold Lees and some adjoining property to the guardians of Edmund Sheffield, Duke of Buckingham, whose brother and heir sold it to Guy's Hospital. The hospital governors pulled down nearly all of the buildings and converted the grounds into farms. (2) The Priory, at Orpington, in Kent, a gabled house whereof the greater portion was built in the year 1471, after the early Tudor style. The oldest part is a stone annexe (1393) which was used by the priest who served the church; some of the principal rooms, fitted with oak and chestnut wood-work, were added by the Honourable Richard Spencer, who died there in November, 1661. In 1032 the priory belonged to Christ Church, Canterbury. (3) The Abbey-house estate at Abingdon, in the grounds of which stand the remains of the monastery originally removed thither from Bagley Wood by Cissa, *temp.* Centwine, who ruled over Wessex, 676-85. Having been destroyed by the Danes in 871, it was refounded by Alfred's grandson Edred in 955, and augmented by Edgar and Canute. The foundation increased in opulence, in so much so that at the Dissolution the revenues were valued at 1,876*l.* 10*s.* 9*d.* per annum. (4) A freehold property extending over two acres on the east side of Church-street, Kensington, and abutting upon Kensington Palace-gardens. On the site stand York House and Maitland House, with frontages of 172 ft. and 115 ft. respectively. In the latter house lived James Mill (*obiit* 1836), the historian of India, whose memorial tablet is in the parish church, and in York House lived the Princess Sophia, daughter of George III., who died there on May 27, 1848.

Proposed Public Library and Museum, Chatham.—A Local Government Board inquiry has recently been held at Chatham with reference to the application of the Town Council for sanction to the appropriation of a site at the rear of the Technical Institute, New-road, for the erection of a public library and museum, and to borrow the sum of 2,500*l.* for their erection.

LEGAL.

THE DISTRICT SURVEYOR AND THE BUILDER.

At the Lambeth Police-court, on Tuesday afternoon, Mr. Hopkins concluded the hearing of two summonses taken out by Mr. Ellis Marsland, District Surveyor for Camberwell, against Mr. J. F. Thompson, a builder, of Addington-square, Camberwell; one for beginning to execute work in respect of which a notice was required, before serving such notice; and the second for failing to comply with a notice of irregularity. The case was first before the Court on the 2nd inst., when Mr. Marsland stated that on April 4 he found that an addition had been made to Mr. Thompson's premises without notice. It was then practically completed. The addition consisted of a dressing-room opening out of a bedroom on the first floor. A doorway had been formed from the bedroom; adjoining the dressing-room was a bathroom. Mr. Hopkins asked the witness whether he meant that a new room had been built. Mr. Marsland replied, "Yes, at the side;" adding that an enclosure was formed of old sashes and match-boarding, and that the roof was covered with wood and not with slates, tiles, or metal. After a good deal of correspondence, he met the defendant on June 13, and pointed out the irregularities, and the defendant promised to amend them; but he afterwards resolutely refused to admit that this was an addition to the premises. When the case was first before the Court the defendant made a somewhat involved defence, and Mr. Hopkins said he would adjourn the summonses to go and see the place for himself. Upon the case being now called on the defendant did not answer. Mr. Hopkins, addressing Mr. Marsland, said, "I have come to the conclusion that this is a building, and that whatever you are asking for must follow. What are you asking for?" Mr. Marsland: "An order to amend according to the notice served on the defendant on June 16." Mr. Hopkins made an order accordingly, and also directed the defendant to pay the costs of the proceedings.

RECENT PATENTS:

ABSTRACTS OF PATENTED INVENTIONS.

12,924.—Lavatory Basins: *B. M. Fletcher.*—As the valve is depressed by the action of the pull the basin discharges into an intervening chamber, whose contents are thence forced, by means of a pump, into the outlet pipe; from the chamber a pipe leads to another chamber, through which the pull-rod is passed, a flat upon the rod places the two chambers in communication with the air, so as to relieve the pressure before the valve has been opened.

12,928.—A Combined Fastening: *F. M. Furney.*—The contrivance combines a lock and a sliding bolt; by the former is secured a bent arm which engages with a spring catch that is to be raised with a key placed over an angle-shaped lug or pin; the arm is forced out of the lock by means of a spring.

12,931.—An Appliance for Vices: *C. Wissenbach.*—The inventor seeks to minimise friction between the vice's moveable jaw and the adjusting-screw's collar by placing between them a channelled plate with anti-friction balls and a loose washer, a forked lug upon the plate engages with a pin upon the jaw which is also pressed by projections from the plate.

12,967.—A Fastening for Sashes, &c.: *H. Weatherill.*—The fastening is adapted for doors, shutters, and window sashes; to a plate upon one of the meeting-frames is attached a spring bar that will engage with a notched catch upon a plate secured to the other frame, the bar (which has a handle) may either be joined to the former plate or be bedded to a solid part or to a spring affixed to the plate—the spring being secured with a bolt or rivet whose nut can be turned in the plate's counter-sunk portion; the catch may be dispensed with, and in order that the bar shall not be unduly forced the latter plate is fashioned with a raised portion, or is arranged so that it will overlap the former plate.

13,035.—A Pantograph: *T. Roche.*—The instrument, whilst primarily intended for marking out boot and shoe patterns, is described as being available in respect of other designs and patterns. Its three extensible parallel bars carry clamping wing nuts, together with pointers and scales, a spindle set in a socket in the table upon ball-bearings carries the middle bar of the pantograph, roller castors being placed at the ends of the diagonal, a tracer and a cutter or marking tool are carried by the extended ends of the two side-bars, respectively, the paper under the tool or cutter is held with a spring-clip over a glass sheet, and is fed from a roll beneath the table, there are slots in the plate underneath the tracer for an adjustment of the pattern.

13,040.—Composition for Glass Bricks, Slabs, Tiles, Plaques, &c.: *T. F. Walker, E. M. Walsh, and S. B. Walsh.*—For producing an opaque golden-brown glass called "aventurine" copper or brass filings are melted with soda and sand. For articles of a larger size the fragments are welded and melted together in a mould, the mould, muffle, kiln, or oven being luted or closed so that air shall not obtain access to the mass when in a molten condition.

13,101.—Hydraulic Cranes: *H. Berry.*—For a hydraulic crane fitted with a jib, whose length can be adjusted and which may be luffed without an alteration of the load's height a fixed jib is provided for the crane-post; at its outer end is an adjustable jib that slides between rollers and is turned out with a hydraulic cylinder and ram, between arms, whose lower ends are pivotted to a strut and whose upper ends are joined to the ends of a second pair of arms pivotted to the sliding jib, is mounted a pulley which affords compensation for the lifting chain and becomes relatively displaced with the jib's inward motion, thereby taking up the chain's slack and sustaining the load at a height that remains constant.

13,110.—Hinges for Doors and Gates: *F. Priest.*—In order that the strap hinge may not become displaced lengthwise upon the pin, its central portion is fashioned with a recess, or the strap itself is pressed into recesses, or rings are employed, and for lifting the gate or door off its hinges the top-bearing is caused to slide up upon its back-plate; a set-screw for adjusting the hinge and taking up wear, together with similar screws above and under the pin, may also be used.

13,124.—Roof Glazing: *W. Lawson.*—Corrugations that bend both inwards and downwards are formed upon the flanges of the leaden or other sheet metallic supporting strips; the drifting sideways of rain water past the joints is prevented by means of corrugations, turned ontwards, upon the flanges of the caps; for purposes of free ventilation the latter corrugations should extend along the flange's width; in some instances the caps can be discarded or the supporting-strips and caps can be made sufficiently stiff for enabling the bars to be dispensed with also.

13,146.—A Substitute for Wood, Stone, &c.: *C. Dörr.*—A plastic compound is made by mixing finely divided inorganic substances, such as sand, gravel, &c., or sawdust, &c., with from 10 to 30 per cent. of tar and heating the admixture to from 150 deg. to 200 deg. C., in order to remove its more volatile constituents, or the watery constituents of the tar may be previously removed by distillation; before it has become cold the compound is pressed and stamped into the shapes desired, and, accord-

ingly with its composition, its hardness will be found to vary from that of granite to that of hard wood.

13,202.—A METHOD OF DESCRIBING CONIC SECTIONS: *W. Ziethen.*—Four bars freely jointed together form a rhombus A B C D, a diagonal bar is inserted through and travels easily in two studs over the joints at B and D, and in a stud at its middle point E, beneath the middle stud, at E, is a marking stile; another bar also travels through the middle stud, through a stud over the joint at A, and through a stud at F, remote from the rhombus—it can be clamped to the studs at A and F; spikes are fitted to the studs at F and C so as to hold those two studs in fixed places upon the drawing board or sheet, and a tracing-point is fitted beneath the stud at A. When the tracing-point describes a circle with the radius A F, the stile at E will set out an ellipse, since during the whole movement F E + E A = F E + E C = A F a constant length, whilst the diagonal bar through points B and D forms a tangent to the ellipse whose major axis = the distance from F to A, and whose foci are at F and C. If it be desired to describe a hyperbola, the points A and C are interchanged and the stile will pass between the foci; for a parabola one discards the use of a centre at F and causes the tracing-point to travel along a straight edge or line. The instrument will also avail for the trisection of angles when it is otherwise adjusted for describing an equilateral (or rectangular) hyperbola.

13,239.—TIPPING-BUCKETS FOR CRANES: *E. Davies and J. Jones.*—The lifting-chain and the tipping-chain, both being secured to the frame at the pillar's top, are passed around pulleys in turn, and so, respectively, to the bucket and a hook which a short chain joins to the bucket. Whilst the load is being raised a sliding block, to which a rope is fastened, falls in a slot in the crane's pillar, and carries with it another sliding block, the motion setting up engagement between a bar upon the one block and a pin upon the other block. An adjustable stop will arrest the ascent of the latter block at a predetermined point, when the bucket is allowed to fall, whilst a further rise of the former block brings about a tilting of the bucket.

13,324.—A CRADLE OR CHAIR FOR USE BY HOUSE DECORATORS AND OTHERS: *J. Stone.*—Slotted hooks, turned over the roof's edge or gutter, support a horizontal rail, whose lifting-tackle and pulley-blocks hold up the cradle or chair, which is to be pulled sideways with an endless cord, the cord being passed over pulleys mounted upon blocks clamped on to the rail, and through eyes on the cradle, and having a weight attached to its lower end. Adjustable screwed rods, having forked pointed ends that press against the wall, are made fast with clamping screws, and serve to keep the top hooks in their places. Beneath the chair are horizontal rods, whose rollers bear against the wall, and chains, that extend from the stage's floor to a straining or distance frame, are secured to a common uniting-block, whose hook serves for joining the staging on to the lifting-tackle.

13,342.—A CIRCULAR-SAW GUARD: *P. Lavaur.*—The advancing wood raises the guard's front cover by means of a lever which a cord joins to a second lever beneath the bench, as the wood turns the arms of a star upon which are rollers that press down the end of the lower lever, a V-shaped piece provided with a shield is pivotted upon the front cover, and whilst at first raised with the cover becomes disengaged as the wood touches the tail whereby the shield drops over the wood and falls behind it when the wood has passed forwards; the principle of the invention is specified as being adapted, with certain variations of the mechanism, for use with band and other saws.

13,355.—A BOX FOR WATER-METERS: *H. van W. Estill.*—In order to allow for different depths of the meter the box which contains it is made in two sliding parts, fastened together with set-screws and caulked, at the top is a water-tight cover which can be removed at will, and through the bottom is passed a double pipe joint, having two passages through which the water flows to and from the meter, and joined to the meter pipes by means of a screw-union tightened with an elliptically-shaped gasket that is prevented from turning (and so blocking the passages when the union is being screwed-up) by being sunk in a seating of its own shape; upon removal of the meter a screw cap is put upon the joint which gives a free way from the branch pipe to the service pipe.

13,423.—TREATMENT OF WOOD: *H. C. Williams, E. Bagshawe, and W. H. Pendlebury.*—For water-proofing, fireproofing, and colouring purposes, the wood is, in the first place, treated with an alkaline solution that will dissolve starchy matters, gums, &c., and then, after having been immersed in hot water, is heated to 300 deg. Fahr. and cast into substances which will fill up the pores—for instance, oils, wax, and silicates of potash and soda, to which can be added colouring matters.

13,463.—PIPE JOINTING AND PACKING: *A. C. Trew.*—For making a joint for drain, sewer, and other pipes, undercut flanges are formed upon the pipe ends, which will lie upon a recessed half-socket. The space between the flanges is also to be filled with cement. When cement has been poured into the cavity or recess, then the joint between the pipes' ends is completed by filling the grooves with putty, or some similar material, in which a strip of metal has been wrapped.

13,528.—METALLIC PROPS FOR PITS, &C.: *G. Spencer and F. Chambers.*—The flanges of a bar, having a H-section, are bent so as to form circular arcs, which are joined by a web at the diameter. In the case of a tubular prop its end is closed with either a welded plate or a cap. Within the prop's end is an extended rim through which a holding pin is thrust. In certain modified shapes a bevelled outer rim is fashioned upon the cap so as to prevent the prop ends from becoming splayed outwards when they are subjected to pressure, or the cap may have one outer rim, or inner and outer rims, the prop's lower end being closed and rounded.

13,573.—A CEMENT: *S. J. Woodhouse.*—A cement for use in caulking joints in gas retorts and furnaces, and in steam and hydraulic pipes, for moulding bricks, blocks, and slabs, &c., or for making crucibles, is composed of fireclay, cast-iron or steel borings, lime or forge slag, and refuse from pottery or glassworks, and is to be mixed with water when needed for use. A glazing substance should be laid on when the inside of gas retorts and the jointing of retort-caps, &c., have been caulked.

MEETINGS.

FRIDAY, OCTOBER 26.

Architectural Association.—Mr. Francis Bond, M.A., on "French and English Cathedrals." 7.30 p.m.

Sanitary Institute (Lectures for Sanitary Officers).—Mr. H. D. Searles Wood on "Building Materials." 8 p.m.

Institution of Junior Engineers.—Annual General Meeting at Westminster Palace Hotel. 8 p.m.

SATURDAY, OCTOBER 27.

Sanitary Institute (Demonstrations for Sanitary Officers).—Inspection and Demonstration at Aylesbury Dairy Company's premises, St. Petersburgh-place, Bayswater. 3 p.m.

Builders' Foremen's Association.—Meeting at Memorial Hall, Farringdon-street, E.C. 7.30 p.m.

MONDAY, OCTOBER 29.

Sanitary Institute (Lectures for Sanitary Officers).—Mr. H. D. Searles-Wood on "Sanitary Building Construction and Planning." 8 p.m.

WEDNESDAY, OCTOBER 31.

City of London College Science Society.—Dr. J. H. Gladstone, F.R.S., on "Metals of the Ancients."

Sanitary Institute (Lectures for Sanitary Officers).—Mr. W. C. Tyndale on "Calculations, Measurements, and Plans and Sections." 8 p.m.

THURSDAY, NOVEMBER 1.

Civil and Mechanical Engineers' Society.—Mr. G. F. Emery on "Patent Law." 8 p.m.

Carpenters' Hall, London Wall (Lectures on Sanitary Building Construction).—Mr. James Bartlett on "Setting Out Work and Bye-Laws." 7.30 p.m.

FRIDAY, NOVEMBER 2.

Sanitary Institute (Lectures for Sanitary Officers).—Professor Henry Robinson on "House Drainage." 8 p.m.

SATURDAY, NOVEMBER 3.

British Institute of Certified Carpenters.—Meeting at Carpenters' Hall. 6 p.m.

Dundee Institute of Architecture.—Opening lecture, "Some Byeways in Architecture," by Mr. G. S. Aitken, F.S.A. 7 p.m.

Institution of Junior Engineers.—Visit to Millbank Station of London Hydraulic Power Company. 3 p.m. (Postponed from October 27.)

Sanitary Institute (Demonstrations for Sanitary Officers).—Inspection and demonstration at the Sewage and Destructor Works, Ealing. 2.15 p.m.

SOME RECENT SALES OF PROPERTY.

ESTATE EXCHANGE REPORT.

October 9.—By HUMBERT & FLINT (at Watford).

Watford, Herts.—Church-rd., "St. Hubert's Lodge," f.	£1,350
10 and 12, Langley-rd., f.	410
4, 6, 8, 10, 22, and 24, Nascot-st., f.	1,480
Westbury-rd., "Verdun" and "Halstow," f., r. 56*l.*	560
Leavesden, Herts.—Watford-rd., enclosure of land, 6 a. 0 r. 8 p., f.	1,300
Abbots Langley, Herts.—King's Langley-rd., enclosure of land with cottage thereon, 4 a., f.	630

October 10.—By H. DONALDSON & SON.

Hackney.—3 and 22, Wharf-rd.; 19, Marian-sq.; also Alexandra Wharf, u.t. 68 and 43 yrs., g.r. 108*l.* 10*s.*	3,400
Wharf-rd., factory premises, warehouse, &c., u.t. 68 yrs., g.r. 30*l.*, r. 165*l.*	1,300
5 to 15 (odd), Wharf-rd., u.t. 68 yrs., g.r. 30*l.*	1,300

By PHIBBS, GIBSON, & CO.

Norwood.—89, St. Julian's Farm-rd., u.t. 84 yrs., g.r. 7*l.* 7*s.*	400
29, 33, and 35, Chestnut-rd., u.t. 91 yrs., g.r. 30*l.*, r. 146*l.*	1,510
Dulwich.—7, Acacia-grove, u.t. 50 yrs., g.r. 3*l.*, e.r. 36*l.*	360
8, Acacia-grove, u.t. 50 yrs., g.r. 3*l.*, r. 36*l.*	300

October 11.—By BELLAMY & MOORE.

Hackney.—34 & 36, Annis-rd., u.t. 44 yrs., g.r. 8*l.*, r. 56*l.*	545

By FRED. W. HARRISON.

Bermondsey.—Spa-rd., i.g.r. 120*l.* u.t. 14 yrs., g.r. 50*l.*	450

By NEWBON, EDWARDS, & SHEPHARD.

Paddington.—80, Praed-st., u.t. 21 yrs., g.r. 6*l.*, r. 75*l.*	430
Clerkenwell.—72, Myddleton-sq., u.t. 12 yrs., g.r. nil, r. 57*l.* 15*s.*	280
Hornsey.—25, Harvey-rd., u.t. 92 yrs., g.r. 6*l.* 10*s.*	£145

By E. & A. SWAIN.

Notting-hill.—6 & 8, St. Charles-sq., u.t. 72 yrs., g.r. 17*l.*	850
18 to 24 (even), St. Charles-sq., u.t. 72 yrs., g.r. 34*l.*	1,670

By FISHER, STANHOPE, & DRAKE.

Stoke Newington.—99, Cazenove-rd., u.t. 73 yrs., g.r. 14*l.*, e.r. 80*l.*	300
215, High-st., u.t. 47 yrs., g.r. 8*l.* 12*s.*, r. 70*l.*	310
36, Bouverie-rd., u.t. 57 yrs., g.r. 7*l.* 10*s.*, r. 36*l.*	410
Stamford Hill.—Nos. 23 and 25, u.t. 42 yrs., g.r. 18*l.*, e.r. 130*l.*	1,200

By C. C. & T. MOORE.

Homerton.—97, 99, and 101, Glyn-rd., and 6, Chelmer-rd., u.t. 81 yrs., g.r. 13*l.*	1,300
79 to 95 (odd), Glyn-rd., u.t. 81 yrs., g.r. 30*l.*	2,160
2 and 4, Chelmer-rd., u.t. 81 yrs., g.r. 5*l.*	660
51 to 77 (odd), Daubeney-rd., u.t. 81½ yrs., g.r. 28*l.*	3,670
Bow.—36, Lincoln-st., f., r. 26*l.*	320
Hackney.—100 to 106 (even).—St. Peter-st., u.t. 55 yrs., g.r. 19*l.*	1,130

By STIMSON & SONS.

Victoria Docks.—North Woolwich-rd., f.g.r. 40*l.*, reversion in 97 yrs.	880
Westminster.—14 and 16, Chadwick-st., f., e.r. 50*l.*	590
39, Chadwick-st., u.t. 26 yrs., g.r. 40*l.*, r. 100*l.*	430
Woodford.—1 to 4, York-villas, f., r. 78*l.* 10*s.*	865
Battersea.—16, Latchmere-rd., u.t. 65 yrs., g.r. 5*l.* 5*s.*	300
Southwark.—2 and 4, Gladstone-st., u.t. 28 yrs., g.r. 6*l.*, r. 57*l.*	550
Camberwell.—14, Dagmar-rd., u.t. 57 yrs., g.r. 7*l.*, e.r. 45*l.*	450
Old Kent-rd.—44 to 56 (even), Bridson-st., u.t. 24½ yrs., g.r. 14*l.*	300
Rotherhithe.—85, Clarence-st., f., r. 30*l.*	340
Brixton.—10, Medwin-st., u.t. 75 yrs., g.r. 6*l.* 10*s.*, e.r. 34*l.*	300

By RAWLINS & CO. (at Barking).

Barking, Essex.—St. Awdry's-rd., &c., 126 plots of building land, f. (in lots)	5,016

October 12.—By P. & G. GREEN.

Walworth.—146, Lorrimore-rd., r. 45*l.*; also L.g.r. 8*l.*, u.t. 50 yrs., g.r. 13*l.*	415
Kennington.—1, Reedworth-st., u.t. 65 yrs., g.r. 1*l.* 10*s.*, r. 32*l.*	335
New Kent-rd.—Gurney-st., "Gloucester House," u.t. 42 yrs., g.r. 20*l.*	665

By W. R. NICHOLAS & CO.

Saffron Walden, Essex.—"Bury Hill House," f.	1,635

By NOTT, CARTWRIGHT, & ETCHES.

Pimlico.—113, Lupus-st., u.t. 33 yrs., g.r. 5*l.*, r. 100*l.*	900
67, St. George's-rd., u.t. 30 yrs., g.r. 12*l.*, r. 100*l.*	810
Westminster.—53, Tachbrook-st., u.t. 20 yrs., g.r. 6*l.*, r. 50*l.*	330
Streatham.—14, Leigham Vale, u.t. 85 yrs., g.r. 6*l.* 10*s.*, r. 40*l.*	450
43, Leverson-st., u.t. 97 yrs., g.r. 2*l.*, r. 45*l.*	440
Tooting.—82, Longley-rd., f., e.r. 60*l.*	750

By ROUCH, PARKHOUSE, & LUCK.

Highgate.—Shepherd's Hill, "Shepherd's Cot" and nearly 1½ a., u.t. 77 yrs., gr. 57*l.* 10*s.*	1,800

By BRUTON, KNOWLES, & CO. (at Chippenham).

Bremhill, Wilts.—Cadenham Manor Estate, 156 a. 1 r. 30 p., f.	6,000

By MORRIS, MARSHALL & POOLE (at Bishop's Castle).

Clun, Salop.—Whitcott Farm, 241 a. 2 r. 18 p., f., r. 140*l.*	2,750

October 13.—By H. J. WAY & SON (at Newport).

Whitwell, Isle of Wight.—Moorhills Estate, 60 a. 2 r. 21 p., f.	1,825

By RAWLINS & CO. (at Croydon).

Croydon.—Sanderstead-rd., &c., 19 plots of building land, f.	2,681

By THORNBORROW & CO. (at Carlisle).

Holme Low, Cumberland.—Longcummercatiff Farm, 60 a. 1 r. 33 p., f.	2,040

By MORRIS, SONS & PEARD (on premises).

Taunton, Somerset.—East-st., the London Hotel, with shop and warehouse adjoining, area 53,774 ft., f.	7,900

October 15.—By TOPLIS & HARDING.

South Lambeth.—13, 14, and 16, Wilkinson-st., u.t. 62½ yrs., g.r. 18*l.* 10*s.*, r. 122*l.*	1,340

By GREEN & SON (of Hammersmith).

Hounslow, Middlesex.—1 to 6, Maswell Park-ter., u.t. 93 yrs., g.r. 24*l.*	900
1 to 6, Maswell Park-villas, u.t. 93 yrs., g.r. 24*l.*	900
Chiswick.—64 to 70 (even), Paxton-rd., f.	1,340
24, Upham Park-rd., u.t. 68½ yrs., g.r. 5*l.* 5*s.*, r. 30*l.*	265
Camden Town.—7, St. Paul's-cres., u.t. 50 yrs., g.r. 4*l.*, r. 40*l.*	455
Leytonstone.—14, Harrow-rd., f.	260

By PERCIVAL HODSON.

Highbury.—51, Elwood-st., f., r. 55*l.*	350
17 to 23 (odd), Elwood-st., u.t. 42 yrs., g.r. 10*l.*, r. 78*l.*	645
Finchley.—Nether-st., a corner building site, f.	380

By WILLIAM HOUGHTON.

Leyton.—Oliver-rd., a freehold building estate, area 16 acres	7,250
Chelsea.—14 and 16, Meek-st., u.t. 83 yrs., g.r. 12*l.* 12*s.*, r. 68*l.*	745
Walthamstow.—Duke's Head Passage, a freehold building site, c.	100
1, 2, and 3, West-avenue, f., r. 93*l.* 10*s.*	1,250
West-avenue, a freehold building site	150
West-avenue, Amina Cottage, f.	735

By ALFRED RICHARDS.

Edmonton.—Hertford-rd., William the Fourth building estate, 8 a. 2 r. 11 p., f. (including f.g.r. 27*l.* 3*s.*, reversion in 7 years)	5,825
Enfield Highway.—Turkey-st., The Harrow b.-h. and nearly ¾ of an acre, f. and c., r. 90*l.*	1,330

By NORMAN & SON (at Stratford).

Victoria Docks.—Grange-rd., three plots of land, f.	120
Graham-rd., a factory site, area 9,000 ft., f.	185
Stratford.—36, Wingfield-rd., f.	330
Leyton.—12 to 20 (even), Grange Park-rd., f.	1,720
Forest Gate.—Hamfrith-rd., Hailey Lodge, f., r. 65*l.*	1,500

[*See also next page.*

COMPETITIONS, CONTRACTS AND PUBLIC APPOINTMENTS.

(For some Contracts, &c., still open, but not included in this List, see previous issues.)

COMPETITIONS.

Nature of Work.	By whom Advertised.	Premiums.	Designs to be delivered
*St. Matthias' Church Schools	Salford Corporation	50*l.*, 30*l.* and 20*l.*	Nov. 22

CONTRACTS.

Nature of Work or Materials	By whom Required.	Forms of Tender, &c., Supplied by	Tenders to be delivered
*Alterations to School Buildings	Waltham Holy Cross Sch. Bd.	Clerk, School Board Offices, Waltham Abbey	Oct. 29
Street Works, Catherine-street, &c.	Mountain Ash (Glam.) U.D.C.	Surveyor, Town Hall, Mountain Ash	Oct. 30
*Kerbing, Paving, &c.	Lewisham Board of Works	Surveyor's Department, Board's Offices	do
Farm Buildings, Stanton	Swadlincote U.D.C.	T. Kidd, Surveyor, Swadlincote	Oct. 31
Public Offices, Whitbarrow-lane	Lymm U.D.C.	S. P. Silcock, Architect, Warrington	do.
Road Works	Erdington (Birmingham) U.D.C.	H. H. Humphries, Surveyor, Public Hall, Erdington	do.
Viaduct, &c., over River Dearness, near Durham	North-Eastern Railway Company	C. A. Harrison, Central Station, Durham	do.
Road Works, &c., Union-road	Oswaldtwistle(Lancs.)Corporation	R. N. Hunter, Surveyor, Town Hall	do.
Road, Porth, Wales	Newport (Mon.) Gas Company	T. Rees, Civil Engineer, Corn Exchange Chambers, Newport, Mon.	do.
House at Gasworks, Crindau		Engineer, Gasworks, Mill-street	do.
Six Houses and Shop, St. George's-road, Barnsley		Wade & Turner, Architects, 10, Pitt-street, Barnsley	do.
Paving Works, Bill Quay	Felling (Durham) U.D.C.	G. Bolam, Council Offices, Felling, R.S.O.	do.
Steel Bridge over Bridgewater Canal	Lymm U.D.C.	T. G. Lumb, Civil Engineer, 24, Birley-street, Blackpool	do.
Cast-iron Pipes	Gainsborough U.D.C.	R. W. Fraser, Engineer, Council Offices	do.
Additions to Baptist Church, Grantown, N.B.		Jno. Robertson, Architect, Inverness	do.
Porter's Lodge at Hospital, Morriston, N.B.		A. & W. Reid & Wittett, Architects, Elgin	do.
Offices at Gasworks	Birstall District Council	W. Middlebrook, Council Offices, Bradford-road, Birstall	do.
"Ruskin" Museum, Coniston		R. Walker, Architect, Windermere	Nov. 1
Hotel, Tanshelf, Pontefract	Mr. W. Pickersgill	Tennant & Bagley & E. E. Pickersgill, Architects, Pontefract	do.
Houses (5 Contracts), Aberdeen		Wilsone & Duffus, Aberdeen	do.
House, St. Athan, near Cardiff		Mr. H. J. D. Parsons, Bamfylde House, Exeter	do.
Nineteen Houses, Manston, Yorks	Mr. J. Inchbold	G. W. Atkinson, Architect, 1, Mark-lane, Leeds	do.
*Hydraulic Machinery, &c.	Midland Railway	See Advertisement	Nov. 2
Additions to Board Room, Hallam-street	West Bromwich Guardians	Mr. Rollason, Architect, High-street, West Bromwich	do.
Paving Works, Council House	Handsworth (Staffs.) U.D.C.	H. Richardson, Civil Engineer, Council House	do.
Streets & Sewers, Barrow Island		J. Thompson, 237, Dalton-road, Barrow-in-Furness	do.
School, near Barnsley	Barugh School Board	R. & W. Dixon, Architects, 5, Eastgate, Barnsley	do.
Electricity Works	Devonport Corporation	Borough Electrical Engineer, Devonport	do.
Additions to Sanatorium, Marsden-road	Burnley Joint Hospital Board	A. S. Sheldon, Town Hall, Burnley	Nov. 3
Coastguard Station, Dirk Cove, co. Cork	Office of Public Works	Director, Office of Works, Dublin	do.
Café, Water-street	Londonderry Temperance Council	M. A. Robinson, Civil Engineer, Richmond-street, Londonderry	do.
Sewerage Works, &c., Little Sutton, Chester	Wirral R.D.C.	Beloe & Priest, Civil Engineers, 13, Harrington-street, Liverpool	Nov. 5
Refuse Destructor, &c.	Rhyl U.D.C.	A. A. Goodall, Surveyor, Clwyd-street, Rhyl	do.
Buildings: Woodlands-road and St. George's-road.	Glasgow Corporation	J. Lindsay, City Chambers, Glasgow	do.
Waterworks Extension, Carcluie	Ayr Town Council	J. Young, Engineer, Town Buildings, Ayr	do.
Making-up Fair Hill New-road	Larne (Ireland) U.D.C.	Town Surveyor, Town Hall, Larne	do.
Carriage House, Albert Pier	Penzance Corporation	F. Latham, Civil Engineer, Public Buildings, Penzance	do.
Boundary Walls, &c., Heath-road and Cripplegate	Halifax Corporation	Jas. Lord, Borough Engineer, Town Hall	do.
*Stone Paving	Tottenham U.D.C.	P. E. Murphy, Engineer, 712, High-road, Tottenham	Nov. 6
Refuse Destructor, Doughty-road	Grimsby Corporation	H. G. Whyatt, Civil Engineer, Town Hall	do.
Post Office, &c., Sligo	Office of Public Works	Director, Office of Works, Dublin	Nov. 8
*Dust Destructor	Walker, Northumberland U.D.C.	Handcock & Dykes, Engineers, 1, Victoria-street, S.W.	Nov. 12
Public Convenience, Harold-place	Hastings Corporation	P. H. Palmer, Civil Engineer, Town Hall	do.
*Waterloo School	Oldham School Board	See Advertisement	do.
Drainage Works, Lake-street and Others	Dartmouth U.D.C.	T. O. Veale, surveyor, Castle View, Dartmouth	Nov. 14
*Isolation Hospital	Spennymoor U.D.C.	G. W. Rogers, Surveyor, Spennymoor	Nov. 19
*Engine House and Boiler House, &c.	Darlington Corporation	Borough Surveyor, Town Hall, Darlington	Nov. 22
*Pumping Engine, &c.	do.	do.	do.
Car deposit, &c., Cleveland-road	Wolverhampton Corporation	J. W. Bradley, Civil Engineer, Town Hall	do.
*Electric Lighting Plant at New Workhouse	Nottingham Guardians	Clerk, Poor Law Offices, Nottingham	No date
Hotel, Main Cliffe-road, Kessingland		G. Fitt & Co., Ltd., Architects, 1, Queen-street, Norwich	do.
Works, &c., at Business Premises, Park-lane, Leeds		Butler, Wilson & Co., Architects, 12, East-parade, Leeds	do.
Mission Hall, Clay Cross, Derbyshire		E. Oxley, Architect, Clay Cross	do.
Boiler House, &c., Newley, near Leeds		G. F. Bowman, Architect, 5, Greek-street, Leeds	do.
Iron Bridge over River Wye, High Wycombe	Lord Carrington.	Carter, Jones & Co., Surveyors, Market Hill, Cambridge	do.
Reservoir, Yelverton, Devon		J. Mullins & Sons, Colerne Box, Wilts	do.

PUBLIC APPOINTMENTS

Nature of Appointment.	By whom Advertised.	Salary.	Application to be in
*Clerk of Works	Liverpool Vestry	3 guineas per week	Oct. 25
*General Engineering and Surveying Assistant	Salford Corporation	120*l.* per annum	Oct. 31
*Engineer and Clerk of Works	Mutford and Lothingland U.D.C.	See Advertisement	Nov. 1
*Clerk of Works	Minehead U.D.C.		Nov. 6
*Junior Architectural Draughtsman		80*l.* per annum	No date
*Assistant	Cowpen U.D.C.		do.

Those marked with an asterisk (*) are advertised in this Number. ***Competitions,*** *p.* iv. ***Contracts,*** *pp.* iv. vi. viii. x. *&* xxi. ***Public Appointments,*** *pp.* xviii. xix. *&* xxi.

Leytonstone.—129 to 139 (odd), Harrow-rd., u.t. 78 yrs., g.r. 20*l.* £1,030

By Henry Hendriks (at Birmingham).

Moseley, Worcester.—Russell-rd., Shaftesbury House and Fillongley, u.t. 75½ yrs., g.r. 80*l.* 1,050

Greenland-rd., Ivy House, f. 675

Handsworth, Staffs.—Devonshire-rd., Eversley, f. 53 and 55, Thornhill-rd., u.t. 91 yrs., g.r. 6*l.* 2*s.* 6*d.* 990

October 16.—By J. A. Lumley, Newton, & Dowell.

Melrose, Roxburghshire.—The Estate of Ravenswood, 363 a., f. 41,000

By G. Ernest Clarke.

Walthamstow.—62, 64, and 66, Beulah-rd., f. 900

Upper Walthamstow-rd., Rostock House, u.t. 95 yrs., g.r. 7*l.*, e.r. 40*l.* 475

By Hampton & Sons.

Westbourne Park.—30, Westbourne Park Villas, u.t. 443 yrs., g.r. 7*l.* 14*s.*, e.r. 60*l.* £493

Walton-on-Thames.—Ryden's-avenue, Lyndhurst, f., r. 75*l.* 1,295

By Mansell & Rowe.

Norwood.—18, Gipsy Hill, u.t. 46 yrs., g.r. 10*s.*, r. 45*l.* 550

By Crafter, Harris & Co. (at Masons' Hall Tavern).

Streatham.—Mitcham-lane, the Streatham Park Hotel, u.t. 60 yrs., r. 100*l.* with goodwill £5,200

By J. C. Platt (at Hammersmith).

Acton.—4, 6, and 8, Berrymead-gardens, u.t. 89 yrs., g.r. 15*l.* 15*s.* 790

23 to 29 (odd), Cunnington-st., f. 1,225

Hammersmith.—29, Girdlers-rd., u.t. 65 yrs., g.r. 2*l.* £400

20, Paddenswick-rd., f., r. 45*l.* 700

October 17.—By Percy H. Clarke.

Soho.—9, Berwick-st. and cottage in rear, f., e.r. 262*l.* 3,400

Old Brompton, Kent.—Moiety of 47, High-st., f., r. 40*l.* 270

Contractions used in these lists.—**F.g.r.** for freehold ground-rent; **l.g.r.** for leasehold ground-rent; **i.g.r.** for improved ground-rent; **g.r.** for ground-rent; **r.** for rent; **f.** for freehold; **c.** for copyhold; **l.** for leasehold; **e.r.** for estimated rental; **u.t.** for unexpired term; **p.a.** for per annum; **yrs.** for years; **st.** for street; **rd.** for road; **sq.** for square; **pl.** for place; **ter.** for terrace; **cres.** for crescent; **yd.** for yard.

PRICES CURRENT OF MATERIALS.

*** Our aim in this list is to give, as far as possible, the *average* prices of materials, not necessarily the lowest. Quality and quantity obviously affect prices—a fact which should be remembered by those who make use of this information.

BRICKS, &c.

	£ s. d.			
Hard Stocks	1 16 0	per 1,000	alongside,	in river.
Rough Stocks and Grizzles	1 12 0	,,	,,	,,
Smooth Bright Facing Stocks..	2 18 0	,,	,,	,,
Shippers	2 2 0	,,	,,	,,
Flettons.....	1 10 0	,,	at railway depôt.	
Red Wire Cuts ..	1 15 0	,,	,,	,,
Best Fareham Red	3 11 6	,,	,,	,,
Best Red pressed Ruabon Facing.	5 5 0	,,	,,	,,
Best Blue Pressed Staffordshire ..	4 7 0	,,	,,	,,
Do., Bullnose	4 12 0	,,	,,	,,
Best Stourbridge Fire Bricks	4 4 6	,,	,,	,,
GLAZED BRICKS.				
Best White and Ivory Glazed Stretchers.....	13 0 0	,,	,,	,,
Headers	12 0 0	,,	,,	,,
Quoins, Bullnose, and Flats	17 0 0	,,	,,	,,
Double Stretchers	19 0 0	,,	,,	,,
Double Headers..	16 0 0	,,	,,	,,
One Side and two Ends	19 0 0	,,	,,	,,
Two Sides and one End	20 0 0	,,	,,	,,
Splays, Chamfered, Squints	20 0 0	,,	,,	,,
Best Dipped Salt Glazed Stretchers and Headers ..	32 0 0	,,	,,	,,
Quoins, Bullnose, and Flats	14 0 0	,,	,,	,,
Double Stretchers	15 0 0	,,	,,	,,
Double Headers..	14 0 0	,,	,,	,,
One Side and two Ends	15 0 0	,,	,,	,,
Two Sides and one End	13 0 0	,,	,,	,,
Splays, Chamfered, Squints	14 0 0	,,	,,	,,
Seconds Quality White and Dipped Salt Glazed	2 0 0	,,	less than best.	

	s. d.		
Thames and Pit Sand	8	0	per yard, delivered.
Thames Ballast	6	9	,, ,,
Best Portland Cement	38	0	per ton ,,
Best Ground Blue Lias Lime..	24	6	,, ,,

NOTE.—The cement and lime is exclusive of the ordinary charge for sacks.

Grey Stone Lime ..... 12s. 6d. per yard, delivered.
Stourbridge Fire-clay in sacks, 32s. 6d. per ton at rly. dpt.

STONE.

	s. d.			
Ancaster in blocks	2	0	per ft. cube, deld. rly. depôt	
Bath ,, ...	1	7	,,	,,
Farleigh Down Bath ..	1	8	,,	,,
Beer in blocks	1	6½	,,	,,
Grinshill ,, ...	1	10	,,	,,
Brown Portland in blocks	2	2	,,	,,
Darley Dale ,,	2	2½	,,	,,
Red Corsehill ,,	2	5	,,	,,
Red Mansfield ,,	2	4½	,,	,,
Hard York ,,	2	10	,,	,,
Hard York 6 in. sawn both sides landings, to sizes (under 40 ft. sup.)	2	7	per ft. super. at rly. depôt.	
,, ,, 6 in. Rubbed Ditto..	2	10½	,,	,,
,, ,, 3 in. sawn both sides slabs (random sizes)	1	3	,,	,,
,, ,, 3 in. self-faced Ditto	0	9	,,	,,

SLATES.

in. in.	£ s. d.		
20×10 best blue Bangor..	11 5 0	per 1000 of 1200	at rly. dep.
,, best seconds ,,	10 15 0	,,	,,
16× 8 best ,,	6 2 6	,,	,,
20×10 best blue Portmadoc	10 18 0	,,	,,
16× 8 best blue Portmadoc	6 0 0	,,	,,
20×10 best Eureka unfading green.....	11 2 6	,,	,,
16× 8 ,, ,,	6 15 0	,,	,,
20×10 Permanent green	10 0 0	,,	,,
16× 8 ,, ,,	5 12 6	,,	,,

TILES.

	s. d.			
Best plain red roofing tiles..	41	6	per 1,000	at rly. depôt.
Hip and valley tiles....	3	7	per doz.	,, ,,
Best Broseley tiles	48	6	per 1,000	,, ,,
Hip and valley tiles....	4	0	per doz.	,, ,,
Best Ruabon Red, brown or brindled Do. (Edwards)	57	6	per 1,000	,, ,,
Do. ornamental Do.	60	0	,,	,, ,,
Hip tiles.....	4	0	per doz.	,, ,,
Valley tiles.....	3	9	,,	,, ,,
Best Red or Mottled Staffordshire Do. (Peakes) .	50	9	per 1,000	,, ,,
Hip tiles	4	1	per doz.	,, ,,
Valley tiles.....	3	8	,,	,, ,,

WOOD.

BUILDING WOOD.—YELLOW.

	At per standard. £ s. d.	£ s. d.
Deals : best 3 in. by 11 in. and 4 in. by 9 in. and 12 in.	16 10 0	18 0 0
Deals : best 3 by 9	14 10 0	15 10 0
Battens : best 2½ in. by 7 in. and 8 in. and 3 in. by 7 in. and 8 in.....	12 10 0	13 10 0
Battens : best 3 by 6 and 3 by 6 ..	0 10 0	less than 7 in. and 8 in.
Deals : seconds	1 0 0	less than best
Battens : seconds.....	0 10 0	,, ,, ,,

	At per load of 50 ft.		
Fir timber : Best middling Danzig or Memel (average specification)	4 10 0	5 0 0	
Seconds	4 5 0	4 10 0	
Small timber (8 in. to 10 in.)	3 12 6	3 15 0	
Swedish balks.....	2 15 0	3 0 0	
Pitch pine timber (35 ft. average)..	4 0 0	4 10 0	

JOINERS' WOOD.

	At per standard.	
White Sea : First yellow deals, 3 in. by 11 in.....	27 10 0	28 10 0
3 in. by 9 in.	24 0 0	25 0 0
Battens, 2½ in. and 3 in. by 7 in.	20 0 0	21 0 0
Second yellow deals, 3 in. by 11 in.	22 10 0	24 0 0
,, ,, 3 in. by 9 in.	20 0 0	21 0 0
Battens, 2½ in. and 3 in. by 7 in.	16 10 0	18 0 0
Third yellow deals, 3 in. by 11 in. and 9 in.	16 10 0	18 0 0
Battens, 2½ in. and 3 in. by 7 in.	13 10 0	14 10 0
Petersburg : first yellow deals, 3 in. by 11 in.	25 0 0	26 0 0
Do. 3 in. by 9 in.	22 0 0	23 0 0
Battens.....	16 10 0	17 10 0
Second yellow deals, 3 in. by 11 in.....	18 10 0	20 0 0
Do. 3 in. by 9 in.	17 0 0	18 0 0
Battens.....	14 0 0	14 10 0
Third yellow deals, 3 in. by 11 in.....	15 0 0	16 10 0
Do. 3 in. by 9 in.	14 0 0	14 10 0
Battens.....	12 10 0	13 10 0
White Sea and Petersburg :—		
First white deals, 3 in. by 11 in..	15 10 0	16 10 0
,, ,, ,, 3 in. by 9 in. ..	14 0 0	15 0 0
Battens.....	12 10 0	13 10 0
Second white deals 3 in. by 11 in.	14 0 0	15 0 0
,, ,, ,, 3 in. by 9 in.	13 0 0	14 0 0
,, ,, battens	11 0 0	12 0 0
Pitch pine : deals	16 0 0	18 0 0
Under 2 in. thick extra	0 10 0	1 0 0
Yellow Pine—		
First, regular sizes	30 0 0	33 0 0
Broads (12 in. and up)	2 0 0	more.
Oddments	22 0 0	24 0 0
Seconds, regular sizes	24 10 0	26 10 0
Yellow Pine Oddments	20 0 0	22 0 0
Kauri Pine—		
Planks, per ft. cube	0 3 6	0 4 6
Danzig and Stettin Oak Logs—		
Large, per ft. cube	0 2 6	0 2 8
Small ,, ,, ...	0 2 4	0 2 7
Wainscot Oak Logs, per ft. cube ..	0 5 0	0 5 6
Dry Wainscot Oak, per ft. sup. as inch	0 0 8	0 0 9
½ in. do. do.	0 0 7	- - -
Dry Mahogany—		
Honduras, Tabasco, per ft. sup. as inch	0 0 9	0 0 11
Selected, Figury, per ft. sup. as inch	0 1 6	0 2 0
Dry Walnut, American, per ft. sup. as inch.....	0 0 10	0 1 0
Teak, per load	16 0 0	20 0 0
American Whitewood Planks—		
Per ft. cube.....	0 2 3	0 3 0

JOISTS, GIRDERS, &c.

	In London, or delivered to Railway Vans, per ton. £ s. d.	£ s. d.
Rolled Steel Joists, ordinary sections	9 2 6	10 2 6
Compound Girders ,, ,,	12 5 0	13 10 0
Angles, Tees and Channels, ordinary sections	12 10 0	14 10 0
Flitch Plates	11 7 6	12 0 0
Cast Iron Columns and Stanchions, including ordinary patterns	8 15 0	10 10 0

METALS.

	Per ton, in London. £ s. d.	£ s. d.
IRON.—		
Common Bars.....	10 0 0	10 15 0
Staffordshire Crown Bars, good merchant quality	10 15 0	11 5 0
Staffordshire "Marked Bars" ..	13 5 0	- - -
Hoop Iron, basis price.....	11 0 0	11 10 0
,, ,, galvanised	17 0 0	- - -
(* And upwards, according to size and gauge.)		
Sheet Iron, Black.—		
Ordinary sizes to 20 g.	11 5 0	- - -
,, ,, to 24 g.	12 10 0	- - -
,, ,, to 26 g.	13 10 0	- - -
Sheet Iron, Galvanised, flat, ordinary quality.—		
Ordinary sizes, 6 ft. by 2 ft. to 3 ft. to 20 g.....	14 15 0	- - -
,, ,, 22 g. and 24 g.	15 5 0	- - -
,, ,, 26 g.....	16 15 0	- - -
Sheet Iron, galvanised, flat, best quality.—		
Ordinary sizes to 20 g.....	18 0 0	- - -
,, ,, 22 g. and 24 g.	18 10 0	- - -
,, ,, 26 g.....	20 0 0	- - -
Galvanised Corrugated Sheets.—		
Ordinary sizes, 6 ft. to 8 ft. 20 g.	13 15 0	14 10 0
,, ,, 22 g. and 24 g.	14 10 0	15 10 0
Cut nails, 3 in. to 6 in.....	11 10 0	- - -
(Under 3 in. usual trade extras.)		
LEAD—Sheet, English, 3 lbs. & up.	20 7 6	- - -
Pipe in coils	20 17 6	- - -
Soil Pipe..	23 17 6	- - -
ZINC—Sheet—		
Vieille Montagne ..... ton	28 0 0	- - -
Silesian.....	27 10 0	- - -
COPPER—		
Strong Sheet..... per lb.	0 1 1	- - -
Thin ..... ,,	0 1 3	- - -
Copper nails ..... ,,	0 1 3	- - -
BRASS—		
Strong Sheet..... ,,	0 0 11	- - -
Thin ,, ... ,,	0 1 1	- - -

PRICES CURRENT (*Continued*).

	Per ton, in London. £ s. d.	£ s. d.
TIN—English Ingots ..... ,,	0 1 6	- - -
SOLDER—Plumbers' ..... ,,	0 0 8	- - -
Tinmen's ..... ,,	0 0 10	- - -
Blowpipe ..... ,,	0 1 0	- - -

ENGLISH SHEET GLASS IN CRATES.

15 oz. thirds	2½d.	per ft. delivered.	
,, fourths	2¾d.	,,	,,
21 oz. thirds	3¼d.	,,	,,
,, ,, fourths.....	3d.	,,	,,
26 oz. thirds	4¼d.	,,	,,
,, ,, fourths	4d.	,,	,,
32 oz. thirds	5¼d.	,,	,,
,, ,, fourths	5d.	,,	,,
Fluted sheet, 15 oz.	3¼d.	,,	,,
,, ,, 21 ,, ...	4¼d.	,,	,,
½ Hartley's Rolled Plate.....	3d.	,,	,,
⅜ ,, ,, ,, ...	3½d.	,,	,,
½ ,, ,, ,, ...	4d.	,,	,,

OILS, &c.

	£ s. d.	
Raw Linseed Oil in pipes..... per gallon	0 3 1	
,, ,, ,, in barrels ..... ,,	0 3 3	
,, ,, ,, in drums ..... ,,	0 3 4	
Boiled ,, ,, in pipes..... ,,	0 3 4	
,, ,, ,, in barrels ..... ,,	0 3 5	
,, ,, ,, in drums ..... ,,	0 3 7	
Turpentine, in barrels ..... ,,	0 2 7	
,, in drums..... ,,	0 2 9	
Genuine Ground English White Lead ...per ton	27 10 0	
Red Lead, Dry..... ,,	25 0 0	
Best Linseed Oil Putty.....per cwt.	0 9 6	
Stockholm Tar ..... per barrel	1 8 0	

VARNISHES, &c.

	per gallon. £ s. d.
Fine Elastic Copal Varnish or outside work ..	0 18 6
Best Elastic Copal Varnish for outside work ..	1 0 0
Best Elastic Carriage Varnish for outside work	0 16 6
Best Hard Oak Varnish for inside work	0 10 6
Best Extra Hard Church Oak Varnish for inside work	0 10 6
Fine Hard Copal Varnish for inside work	0 16 0
Best Hard Copal Varnish for inside work	1 0 0

VARNISHES, &c.

	per gallon. £ s. d.
Best Hard Carriage Varnish for inside work....	0 16 0
Extra Pale Paper Varnish	0 12 0
Best Japan Gold Size	0 10 0
Best Black Japan	0 16 0
Oak and Mahogany Stain	0 9 0
Brunswick Black	0 9 0
Berlin Black	0 15 0
Knotting	0 10 0
Best French and Brush Polish	0 10 0

TO CORRESPONDENTS.

C. H. (Your question is answered in the first article of this issue. It is a well-known type of construction; nothing out of the way in it.) M. & F. (Amounts should have been stated.) G. F. B. (Below our limit.) H. P. D. (Sent too late.)

NOTE.—The responsibility of signed articles, letters, and papers read at meetings, rests, of course, with the authors.

We cannot undertake to return rejected communications.

Letters or communications (beyond mere news items) which have been duplicated for other journals are NOT DESIRED.

We are compelled to decline pointing out books and giving addresses.

Any commission to a contributor to write an article is given subject to the approval of the article, when written, by the Editor, who retains the right to reject it if unsatisfactory. The receipt by the author of a proof of an article in type does not necessarily imply its acceptance.

All communications regarding literary and artistic matters should be addressed to THE EDITOR; those relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and *not* to the Editor.

TENDERS.

[Communications for insertion under this heading should be addressed to "The Editor," and must reach us *not later than 10 a.m. on Thursdays*. N.B.—We cannot publish tenders unless authenticated either by the architect or the building-owner; and we cannot publish announcements of tenders accepted unless the amount of the tender is given, nor any list in which the lowest tender is under £100, unless in some exceptional cases and for special reasons.]

* Denotes *accepted*. † Denotes *provisionally accepted*.

SOUTH KIRKBY (Yorks).—For the erection of Club Premises, for the South Kirkby Working Men's Club. Messrs. Garside and Pennington, architects, Pontefract, Castleford, and Selby. Quantities by architects :—

Masonry and Bricklaying.*—W. H. Illingworth, East Ordsley, near Wakefield....	£945 0 0
Carpentry.*—E. Chadwick & Sons, Staincliffe, near Dewsbury.....	540 0 0
Plumbing.*—Walker & Co., Heckmondwike.....	172 0 2
Slating.*—Pickles Bros., 66, Park-lane, Leeds	74 0 0
Plastering.*—James Shaw, Pontefract ..	88 17 6
Painting.*—W. Thrall, Pontefract.....	25 0 0
Total.....	£1,844 17 6

BISHOP'S STORTFORD.—For the supply of broken granite (900 tons), &c., for the Urban District Council. Mr. R. S. Scott, C.E., Council Offices, Bishop's Stortford :—

	Quenast Granite. Per ton. s. d.
L. Sommerfeld, Fowkes-buildings, Great Tower-street, London*	13 6

[*See also next page.*

CARLISLE.—For the erection of two houses, Warwick-road. Mr. H. H. Hodgkinson, architect, 9, Lowther-street, Carlisle :—

Building.—E. J. Hill*	£426 10 0
Joinery.—T. Hamilton*	160 0 0
Plastering.—D. Johnston*	91 15 0
Plumbing.—N. Forster*	80 0 0
Slating.—J. Killet*	41 10 0
Painting.—J. Dinard*	21 16 0
Ironwork.—J. Gouge*	17 0 0

[All of Carlisle.]

CROYDON.—For the erection of house, &c., Croham-avenue, for Mr. B. A. Berry. Mr. E. Douglas Hoyland, architect, 2, Walbrook, E.C. :—

T. C. Hobbs	£1,809 0	J. & C. Bowyer	£1,707 15
W. Potter	1,800 0	Newman, Ltd.*	1,640 0
J. R. Bex	1,793 0		

LANCASTER.—For the erection of furniture stores, Water-street, for Mr. J. W. Whittaker. Mr. J. Parkinson, architect, 67, Church-street, Lancaster. Quantities by the architect :—

Masonry, &c.—R. Thompson*	£1,058 10 0
Joinery.—R. Thompson*	803 10 0
Slating.—R. Hall & Son*	186 2 6
Plumbing.—Abbott & Co.*	112 0 0
Painting.—Eaton & Bulfield*	46 7 11

[All of Lancaster.]

LONDON.—For pulling down and rebuilding Nos. 7 and 8, High-street, Marylebone, for Messrs. W. & A. Curnick. Messrs. White & Page, architects, Nos. 4 and 5, Warwick-court, Gray's-inn. Quantities by Mr. Thomas Brown :—

Contract No. 1.

Granite Work to Shop Front.

A. Lee & Bros., Ltd.	£646 0
Whitehead & Sons, Ltd.	640 0
Fenning & Co.*	548 15

Contract No. 2.

Supply and Delivery of Steelwork.

Measures Bros.	£382 18 7	Dorman, Long, & Co., Ltd.	£351 0 0
Moreland & Son, Ltd.	367 0 0	Deane, Ransome, & Co., Ltd.*	349 0 0

Contract No. 3.

Builder's Work.

Lawrance & Sons	£6,973	Bush & Sons	£6,197
H. L. Holloway	6,669	Webber	6,175
Hall, Beddall, & Co.	6,620	Bywaters	6,144
Simpson & Sons	6,460	Wall & Co.*	5,867

RAUNDS (Northants).—For alterations and additions to shoe factory, for Messrs. W. Nichols & Son. Messrs. Mosley & Scrivener, architects, Fish-street, Northampton :—

R. Marriott	£1,345	T. Swindall	£1,219
F. Henson	1,260	W. H. Lovell, Rounds*	1,189
W. Beardsmore	1,247		

SALTASH.—For drainage work on the Path Fields Estate, St. Stephens-by-Saltash, for Mr. J. Bennett. Mr. Edgar M. Leest, architect, Devonport and Saltash :—

W. H. Rothery	£202 0 0	W. R. Deacon	£129 10 6
Jenkin & Son	160 0 0	Smith & Son	124 15 0
T. Shaddock	143 8 8	Taylor & Mutton*	118 0 0
Wm. Shaddock	139 12 0		

STRADBROKE (Suffolk).—For alterations to the Market Hall, for the East Suffolk County Council. Mr. H. Miller, C.E., 16, Museum-street, Ipswich :—

Bullen	£169 0	Sampson	£145 0
Etheridge	148 0	R. Butcher, Stradbroke, Eye*	127 10
Rayner	146 10		
Chandler	145 0		

WEMBLEY.—For the erection of sewage works, Alperton, for the Urban District Council. Mr. C. R. W. Chapman, Surveyor to the Council. Quantities by Mr. Chapman :—

	Section A.	Section B.
Boyer & Son	£2,980 0 0	£562 10 0
H. Haynes, Alperton	2,506 0 0	499 10 0*
J. Meston	3,431 9 4	599 9 9
S. Kavanagh	3,274 11 2	625 17 4
Langler & Pinkham	2,520 0 0	797 0 0
Clift Ford, Harlesden, N.W.	2,364 14 9*	699 0 0
A. T. Catley	2,840 0 0	—
F. W. Trimm	4,794 0 0	886 0 0
Pedrette & Co.	33,12 0 0	596 0 0
S. Saunders	3,095 0 0	840 19 0
G. Bell	3,041 0 0	544 0 0

WITTON (Birmingham).—For the construction of foundations, abutments, and piers, for a steel girder bridge over River Thame at Witton, for the trustees of Mr. James Deykin. Mr. J. E. Willcox, C.E., Union Chambers, 63, Temple-row, Birmingham :—

S. Saunders	£4,355 0 0	Barnes & Co.	£2,555 0 0
J. Mackay	3,226 2 2	J. Biggs	2,333 0 0
Holme & King	3,085 0 0	Curral, Lewis, & Martin, Birmingham*	2,329 9 3
G. Law	2,657 0 0		
T. Vale	2,645 0 0		
W. Craig	2,611 14 5		

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